Tabari Biomedical Student Research Journal

OPEN ACCESS

REVIEW: Access to Skin Cancer Diagnosis, Treatment, and Care in Iran: A Review Article

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ARTICLE INFO

Submitted: 18 Jan 2024
Accepted: 22 Feb 2025
Published: 26 Mar 2025

Keywords:
Neoplasms
Skin cancer
Developing countries
Delivery of health care
Healthcare disparities
Socioeconomic factors
Socioeconomic disparities in health
Resource allocation
Health resources

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Citation:
Abdollahi A, Amouzad P, Khataminejad S, Omrani A. Access to Skin Cancer Diagnosis, Treatment, and Care in Iran: A Review Article. Tabari Biomed Stu Res J. 2025;7(3):10-23.

ABSTRACT

Cancer incidence and mortality rates in developing countries, including Iran, reveal significant disparities compared to developed nations, with skin cancers representing a growing public health concern. This review explores the multifaceted challenges contributing to these disparities, emphasizing healthcare infrastructure, access to dermatologic diagnosis and treatment, and socioeconomic determinants. Limitations in specialized dermatology services and advanced diagnostic tools restrict timely identification and management of skin cancers. Geographic and economic barriers further impede access to cancer care facilities, while financial burdens and referral delays exacerbate these challenges. Additionally, low public awareness regarding skin cancer prevention, early detection, and the importance of dermatologic evaluation contributes to late-stage presentations. This article underscores the need for national policies, standardized diagnostic protocols, and expanded access to screening programs for skin cancer. Emphasizing data-driven strategies, equitable resource allocation, and targeted interventions, this review highlights the critical role of dermatology in improving skin cancer care and outcomes in Iran.

Introduction

The incidence and mortality rates of cancer in developing nations surpass those in developed counterparts, with only a few individuals in low-income countries typically receiving a diagnosis at early cancer stages, in contrast to the high rate of early-stage diagnoses in high-income countries [1-6]. This alarming discrepancy can be attributed to various factors. One key factor is the absence of comprehensive healthcare infrastructure. A well-functioning healthcare infrastructure entails the presence of adequately trained healthcare personnel, state-of-the-art equipment, and an organized system that fosters a meaningful connection with the community [7, 8]. The complex nature of cancer diagnosis necessitates a multifaceted approach, including precise imaging techniques, such as MRI, and thorough pathological examinations involving immunohistochemical findings and genomic studies [9]. Cancer treatment encompasses diverse modalities, from conventional to modern therapies, such as chemotherapy, radiotherapy, targeted therapies, gene therapies, surgical

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interventions, and palliative care [9-15]. Developing countries face significant challenges in each of these domains. In diagnosis, the need for essential tools, equipment, and trained personnel presents formidable obstacles. Access to accurate pathology results and laboratory images is crucial for effective breast cancer treatment, but in developing nations, including Eastern European countries, these challenges impede progress [16, 17]. Finally, most well-equipped laboratories are concentrated in major urban centers, leaving rural areas underserved. The high cost of these diagnostic services further dissuades patients from seeking timely care [16].

Impact of Environmental and Occupational Risk Factors

Environmental and occupational exposures are key determinants of skin cancer incidence, particularly in countries with large agricultural and industrial labor forces. Prolonged ultraviolet (UV) radiation is the most well-established risk factor, and outdoor workers such as farmers, fishermen, and construction workers face disproportionately higher risk. Iran, with its hot and arid climate, places millions of workers at daily risk of chronic UV exposure, yet occupational health regulations mandating protective clothing, hats, or sunscreen are minimal. This lack of preventive infrastructure means that awareness and behavioral change are left largely to individuals, most of whom lack financial resources to purchase adequate sun protection [18]. Beyond UV exposure, environmental carcinogens such as arsenic-contaminated drinking water, industrial chemicals, and polycyclic aromatic hydrocarbons contribute to the risk of non-melanoma skin cancers [18]. Certain provinces with extensive agricultural pesticide use may also face higher risks, though systematic studies remain scarce. Furthermore, rapid urbanization and air pollution add to the complexity, with emerging evidence suggesting a link between particulate matter exposure and oxidative stress in skin cells. Occupational health services in Iran have historically focused on injury prevention rather than long-term cancer prevention, leaving a major policy gap. Integrating cancer prevention strategies into workplace safety regulations, subsidizing protective equipment, and conducting regular skin screenings for high-risk occupational groups could substantially reduce incidence [19]. Without such interventions, the combined impact of environmental and occupational risk factors will continue to drive a silent increase in skin cancer burden, particularly among low-income and rural populations who already face barriers to diagnosis and treatment.

Disparities in access to skin cancer care facilities

The inadequacy of essential radiotherapy devices relative to societal needs is pervasive. For instance, in Africa, available devices meet only approximately 18% of the demand. Similarly, data from 12 Asian countries, including India, reveal that this figure is 23% [7]. This deficit in radiotherapy equipment is starkly evident in Latin American and Eastern European nations [7, 20]. In many developing countries, including Eastern European nations, there is a concentration of cancer surgery centers, often situated in urban areas. Conversely, rural regions frequently lack facilities even for routine surgical procedures [16, 21]. The scarcity of palliative treatments is a pressing concern in developing countries, including Eastern Europe. Several factors contribute to this deficit, including a) Centralization of services in specific urban centers. b) A shortage of registered facilities authorized to procure palliative medications from higher-level centers. c) An absence of a comprehensive national strategy to address and rectify this issue. Globally, access to palliative services is limited, with only 14% of patients having such access. Moreover, the availability and consumption of palliative drugs in developed countries dwarf those in developing nations by approximately 1000 [22]. Compounding these challenges is the lack of dedicated national funding for cancer treatment and the precarious economic

circumstances of patients. Consequently, physicians often opt for treatments aligned with patients' financial constraints rather than utilizing state-of-the-art therapies like targeted therapy [23]. A significant obstacle in developing countries concerning access to anticancer medications is diverting these drugs from government-regulated prices to the open market, where they are sold at exorbitant rates [24, 25]. Given that these drugs are often the lifeline for patients, the resulting high prices have severe implications for individuals in need [16].

Challenges in access to skin cancer care facilities

Access to healthcare facilities is a pivotal determinant of public health, particularly in nations characterized by the unequal distribution of medical services [26]. Developing countries grapple with various constraining factors compared to their developed counterparts, exacerbating issues linked to the scarcity of treatment facilities and subsequently elevating cancer mortality rates [27-29]. An investigative study conducted in Brazil encompassing 399 municipalities aimed to discern the elements associated with access to cancer treatment. Four socioeconomic variables were considered influential: a) literacy rate, denoting the percentage of the population over 15 years of age with reading proficiency. b) income levels, signifying the average earnings within a given city. c) urbanization degree, indicating the extent of urban development, and d) Human Development Index [HDI), a comprehensive measure of human well-being. Additionally, to assess the accessibility of medical centers, the study incorporated the distance from densely populated areas to the nearest medical facility offering chemotherapy, radiotherapy, or mammography services [30]. The findings revealed substantial regional disparities in cancer-related mortality rates, with literacy levels negatively correlated with such rates. In other words, higher literacy rates were associated with reduced factors directly or indirectly contributing to breast cancer incidence, and limited access to medical services correlated positively with increased mortality rates [31]. Moreover, the study underscored that elevated poverty levels and lower literacy rates hindered access to healthcare services [1]. Furthermore, a study conducted in the country of Dallas highlighted significant associations between poverty, race, low literacy levels, and the inadequacy or absence of health insurance coverage with cancer-related mortality rates [32, 33]. Notably, patients receiving cancer treatment at safety-net hospitals—facilities catering to individuals lacking financial resources and insurance coverage—encounter various challenges, including inadequate medical service follow-up. [32, 34-38]. One of the paramount factors significantly affecting access to medical facilities, a challenge pervasive in many developing countries, is the proximity to these centers. This issue is magnified in developing nations due to the inequitable distribution of healthcare facilities. Numerous studies underscore the formidable barriers posed by long-distance travel for cancer patients, which can lead to delays in diagnosis, disease progression, and even treatment abandonment due to the financial burden and diminished survival prospects [2]. Corroborating this, a study conducted in England revealed an inverse relationship between increased travel distance to treatment centers and the survival rates of cancer patients, emphasizing the imperative of ensuring geographical access to cancer treatment facilities [39]. However, it is crucial to note that it transcends mere geographic or cartographic distance when discussing proximity to treatment centers [40]. The availability of suitable, efficient, and cost-effective transportation routes also plays a pivotal role. Research indicates that even cities located farther from treatment centers on a map can exhibit improved access if they possess superior communication infrastructure. For example, Kathleen Stewart and her colleagues conducted a study in Nigeria to assess the accessibility of its residents. Their approach considered the distance to treatment centers, available

transportation (e.g., taxis and buses), travel time, and income levels.

Surprisingly, their findings unveiled that a shorter geographical distance to medical centers did not necessarily translate to improved access [25]. Instead, the critical determinant was the presence of appropriate communication and transportation networks. They further highlighted that, especially for rural populations, the choice of transportation. The graphical representation of referral timelines for aggressive cancer treatment in a cohort of 207 patients diagnosed in Dallas reveals a stark reality: only 12% of diagnosed individuals commence treatment within 30 days of their diagnosis [41]. This delayed initiation of treatment can be attributed to many factors, including disputes between patients and insurance providers regarding service coverage, the need for recurrent hospital visits for confirmatory tests and consultations with attending physicians, and protracted delays in v means exerted a significant influence. This underscores the importance of establishing an effective transportation system for medical centers, particularly in underserved rural areas [26]. Furthermore, research underscores the substantial influence of economic factors, particularly in developing nations. Notably, being insured and having access to comprehensive insurance coverage is pivotal in influencing individuals' healthcare-seeking behavior, impacting both the timing and nature of their referrals [42-45]. This influence extends to various aspects of healthcare, encompassing diagnostic procedures and cancer treatment pathways.

Challenges in cancer diagnosis

Existing healthcare infrastructure and equipment, as well as their accessibility and prevailing challenges, particularly within the domain of breast cancer diagnosis, which stands as a leading cause of cancer-related mortality among women [46-51], warrant our attention.

Mammography, a pivotal tool in breast cancer detection, is beset by several challenges in Iran: a) Geographic disparities in which Iran's mammography centers are inadequately distributed and geographically imbalanced, resulting in a coverage rate of less than 15% [52, 53]. b) lack of insurance coverage, notably, breast cancer diagnostic tests, including mammography, are not encompassed within Iran's purview of insurance coverage. c) limited access to breast examination clinics. Studies conducted in Iran reveal a low range of access to breast examination clinics, from a mere 4% to 20% of the population [52, 53]. Figure 5, derived from a study conducted among middle-aged Iranian women, delineates the rates of referrals for diagnostic procedures [54]. The columns, progressing from right to left, represent the following categories: 1) individuals who have never sought diagnostic testing, 2) those who have rarely sought it, and 3) those who regularly seek such examinations. A substantial proportion of women in Iran have yet to avail themselves of diagnostic tests, underscoring a concerning trend [53].

Role of Teledermatology in Skin Cancer Diagnosis

Teledermatology has emerged as a powerful tool to overcome diagnostic delays in skin cancer, particularly in countries where the distribution of dermatologists and specialized centers is highly uneven. By using high-resolution digital images and video consultations, patients from rural and underserved areas can be connected to specialists without the need for long-distance travel [55]. This approach has been shown to accelerate referrals, reduce unnecessary face-to-face consultations, and facilitate earlier biopsy for suspicious lesions. Evidence from both developed and middle-income countries suggests that teledermatology achieves diagnostic accuracy rates comparable to in-person visits for common skin cancers, provided that high-quality images and trained personnel are available. However, in Iran, the adoption of teledermatology is still in its infancy [55]. Technical barriers such as limited internet connectivity in rural provinces, inadequate digital infrastructure in

public hospitals, and lack of secure data-sharing protocols restrict its widespread use. Moreover, many physicians remain skeptical about its reliability due to concerns about misdiagnosis and medico-legal accountability. Despite these barriers, integrating teledermatology into Iran's national cancer control programs could significantly bridge the urban–rural gap in dermatologic services. Pilot projects focusing on primary healthcare centers, combined with standardized training in digital dermoscopy and image capture, could provide a foundation for scaling up. In addition, incorporating artificial intelligence–based decision support tools into teledermatology platforms may further enhance diagnostic precision, reduce human error, and expand access to timely cancer detection in remote populations [56].

Cancer treatment options

Prevalent malignancies in Iran exhibit distinct patterns between genders. Men's most A frequent cancer types include stomach, bladder, prostate, and colorectal [61]. Conversely, in women, the prevalent cancers encompass breast, colorectal, stomach, and esophagus cancer [2, 62]. A notable deficit in radiotherapy devices exists in Iran, falling short of international standards. Regrettably, only a range of 50% to 70% of cancer patients in need of radiotherapy can access this critical treatment [2]. Notably, sanctions have emerged as a significant underlying cause for specific healthcare challenges [57]. The impact of international sanctions on Iran's public health system began indirectly before frequent cancer types include stomach, bladder, prostate, and colorectal [61]. Conversely, in women, the prevalent cancers encompass breast, colorectal, stomach, and esophagus cancer [2, 62].
sanctions and the severed ties between Iranian financial institutions and the global banking network [58, 63, 64].

Factors contributing to suboptimal utilization of existing facilities

In education, emerging research underscores notable deficit in radiotherapy devices exists in Iran, falling short of international standards. Regrettably, only a range of 50% to 70% of cancer patients in need of radiotherapy can access this critical treatment [2]. Notably, sanctions have emerged as a significant underlying cause for specific healthcare challenges [57]. The impact of international sanctions on Iran's public health system began indirectly before 2015 but escalated significantly after May 2018, with direct and profoundly detrimental effects on the healthcare sector. This holds particular relevance for the domain of cancer care, given that cancer stands as the third leading cause of mortality in Iran [58-60].
For instance, a stark consequence of these sanctions has been the reluctance of numerous major international medical equipment companies to supply Iran with essential medical devices, including those necessary for cancer surgery and PET scans [30]. This hesitancy stems from apprehensions surrounding the potential repercussions of
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For instance, a stark consequence of these sanctions has been the reluctance of numerous major international medical equipment companies to supply Iran with essential medical devices, including those necessary for cancer surgery and PET scans [30]. This hesitancy stems from apprehensions surrounding the potential repercussions of
the paramount significance of public awareness and, particularly, the empowerment of women in society with knowledge regarding breast self-examination as a highly effective strategy for early breast cancer detection on a global scale. Developed countries have successfully embraced this approach, with over 70% of women in such nations being well-informed about these self-care practices, yielding considerable positive impacts.
However, the situation in Iran appears

considerably less optimistic when the available data are examined. A study conducted in Golestan province highlights significant gaps in both professional and public knowledge regarding breast cancer. The findings indicate that only about 50% of healthcare professionals- across both urban and rural settings- have received formal training in breast cancer detection, prevention, and patient education. This limited professional preparedness is further compounded by low levels of public exposure to essential breast cancer education, with just 6% of urban residents and a mere 2% of rural inhabitants reporting familiarity with fundamental breast cancer awareness programs. Such striking disparities reveal a dual-layered problem: not only is the general population insufficiently informed about early detection strategies and self-examination techniques, but the healthcare workforce itself is not uniformly equipped to deliver accurate, timely, and culturally sensitive guidance. This scenario underscores an urgent and pressing need for comprehensive, nationwide educational initiatives. These programs should aim to improve healthcare providers' competencies while simultaneously raising public awareness, promoting routine self-examination, encouraging timely clinical consultations, and ultimately fostering a proactive approach to breast cancer prevention and early detection throughout Iran.

Travel burden in skin cancer care

Another pressing issue exacerbating the challenge of accessing cancer treatment facilities is patients' arduous and lengthy journeys [65, 66]. This necessity arises from the uneven distribution of cancer treatment facilities across Iran's provinces, necessitating intercity travel for patients seeking access to these centers [67]. A study conducted in an Iranian hospital sheds light on the extent of these journeys, revealing that patients compelled to travel, constituting approximately 35% of the patient population, covered an average distance of roughly 455 kilometers. Notably, the absence of a well-structured and comprehensive referral system within the country is a fundamental driver behind the need for these prolonged and demanding patient travels to diagnostic and treatment centers for cancer care in Iran [2, 68]. Addressing these challenges necessitates a holistic approach to healthcare system development and coordination.

Health Literacy and Skin Cancer Awareness in Iran

Low health literacy continues to represent a major barrier to the effective utilization of skin cancer prevention, diagnostic, and treatment services in Iran. Despite the gradual expansion of public health campaigns that have successfully improved awareness of cardiovascular and metabolic diseases such as hypertension and diabetes, skin cancer has remained relatively neglected in national health promotion agendas. As a result, public knowledge regarding preventive behaviors and early warning signs remains alarmingly limited. Surveys indicate that a considerable proportion of the population lacks even the most basic understanding of protective measures—such as the routine use of sunscreen, avoidance of excessive sun exposure, regular self-examination of moles, and the importance of seeking early dermatologic evaluation when suspicious lesions appear. This gap in awareness translates into delayed health-seeking behaviors, with many patients presenting at more advanced stages of the disease, thereby reducing treatment effectiveness, increasing healthcare costs, and worsening survival outcomes. The problem is particularly concerning in rural and underserved communities, where both educational outreach and access to dermatologic services are minimal. Addressing this deficit requires a systematic and culturally tailored approach to health education. Integrating structured skin cancer education into primary healthcare programs could be transformative, particularly if introduced in schools, universities, and community centers where large segments of the population can be

reached early and effectively. In addition, leveraging mass media, digital platforms, and social networks may further enhance the reach of such initiatives. By empowering individuals with accurate knowledge and practical skills, these interventions could foster earlier detection, encourage healthier behaviors, and ultimately reduce the burden of skin cancer on both patients and the healthcare system as a whole.

Cancer Care and the COVID-19 pandemic

The COVID-19 pandemic has had significant and lasting impacts on cancer care, affecting both patients and services. Due to their weakened immune systems, cancer patients were considered at higher risk for severe COVID-19 infections [69-72]. However, several different vaccines have proven effective in reducing this risk by multiple studies [73-78]. Various measures were implemented to maintain cancer care during the pandemic, including telemedicine, modified treatment regimens, and safety protocols. Despite these efforts, the pandemic has disrupted cancer care at multiple stages, from screening to treatment and clinical trials. Studies from different countries highlight the adverse effects, including delayed surgeries, disruptions in pathological approaches, health disparities, and reduced participation in clinical trials [79-83].

The COVID-19 pandemic has placed immense strain on the Iranian healthcare system, affecting various aspects of healthcare, including cancer treatment. Cancer patients faced numerous challenges due to the pandemic, including increased risk of infection, disrupted treatment, delayed surgeries, and limited healthcare access [84, 85]. One approach to cancer care during the pandemic in Iran was telemedicine. It was frequently used for breast cancer patients, primarily through virtual visit services and live video conferences [86].

Financial challenges

A study conducted in East Azerbaijan revealed that cancer patients in Iran face substantial financial distress [87]. Conversely, studies in developed nations like the Netherlands have indicated a comparatively lower financial burden on cancer patients [88]. This underscores a stark contrast in cancer patients' economic challenges in different healthcare systems.

One noteworthy concern among cancer patients in Iran is the fear of disease recurrence [87]. This psychological aspect of cancer management is a significant dimension of the cancer experience in Iran.

A study conducted in an Iranian hospital found that the stage at which cancer is diagnosed shows minimal variance between individuals residing near diagnostic centers and those living farther away (2]. This outcome underscores the critical role economic factors play in cancer diagnosis, suggesting that accessibility to diagnostic services may not significantly affect the stage at which cancer is identified.

Cancer patients in Iran, particularly those with conditions requiring surgery, such as breast cancer, encounter dual types of expenses: direct costs related to cancer treatment and indirect costs stemming from reduced productivity and employment during the cancer journey. Consequently, financial security and stability are pivotal in this process, even though a significant portion of the population lacks this security. In cancer treatment through radiotherapy, the paramount factor for achieving sustained success is consistent and uninterrupted treatment. However, due to the prohibitive cost associated with this modality, it often needs to be consistently administered in countries with disparate income levels, sometimes leading to treatment interruptions [16]. Another notable issue in Iran is the propensity for individuals to seek medical care in private clinics rather than primary healthcare centers, primarily attributed to the superior level of services offered by private clinics [46, 89]. This stands in contrast to high-income countries where primary healthcare centers are typically preferred.

Despite these challenges, there is an encouraging aspect to consider. Studies have demonstrated that cancer patients in Iran

benefit from a robust support network with high hope and social support [87, 90]. This underscores the resilience and strength of the Iranian cancer patient population in the face of these multifaceted challenges.

Psychosocial Impact of Skin Cancer

Beyond its physical and clinical consequences, skin cancer carries a profound and multifaceted psychosocial burden that often extends far beyond the disease itself. Patients may experience visible disfigurement following surgical excisions or other therapeutic interventions, which can lead to long-lasting concerns about appearance, body image, and social acceptance. The persistent fear of recurrence, uncertainty regarding prognosis, and potential for stigmatization in both personal and professional settings can further contribute to heightened levels of anxiety, depression, and emotional distress. These psychological challenges are not uniformly distributed; they tend to be particularly severe in younger individuals and in women, for whom cosmetic outcomes frequently play a central role in shaping self-esteem, identity, and confidence within social interactions. In Iran, these issues are intensified by the limited availability of integrated psycho-oncology services and the general lack of structured support systems to address mental health needs within oncology care. As a result, many patients must cope with these difficulties in isolation, which can significantly impair adherence to treatment, hinder social reintegration, and reduce overall quality of life. Addressing this gap requires the development and implementation of comprehensive, multidisciplinary models of care that integrate psychological counseling, patient education, and supportive therapies alongside conventional medical treatment. Such an approach has the potential not only to improve long-term psychosocial well-being but also to enhance clinical outcomes by fostering resilience, treatment compliance, and holistic recovery.

Cancer care policies

Breast cancer incidence in developed countries has declined since 1990, starkly contrasting to developing nations. A contributing factor to this disparity is implementing breast cancer detection education, structured screening initiatives, and formulation and dissemination of clinical guidelines, benefiting healthcare practitioners and patients [46, 91-97].

An enlightening study conducted in Eastern European countries has spotlighted the persisting challenge of late-stage cancer diagnoses in this region. This predicament underscores the potential benefits of instituting a comprehensive population-wide screening program, which not only has the potential to curtail mortality rates but can also reduce cancer incidence. However, the mere conception of such a screening program, devoid of robust public awareness campaigns delineating its merits, may fall short in effectiveness. An inadequate participation rate among the populace and biased data could result. For instance, an Eastern European screening program witnessed a diminished participant turnout, predominantly attributed to the population's limited awareness regarding breast cancer and the advantages of screening. Researchers have posited that the low participation rate in these screening initiatives leads to a high incidence of overdiagnosis, imposing an additional financial burden on the nation's healthcare system [16]. A comprehensive review by Hanna and colleagues encompassed an extensive examination of cancer-related challenges in developing countries. This encompassed preventive strategies, early detection, treatment modalities, and subsequent palliative care measures. Their findings underscored the necessity for several key initiatives: 1. The expansion of cancer-related databases; 2. Adoption of cancer prevention approaches employed in developed nations; and 3. Enhanced economic evaluations to inform policymaking decisions related to cancer treatment [7]. These recommendations represent a vital step toward improving cancer care in developing countries, reflecting a holistic approach from prevention to

treatment and beyond.

In their study, Hassan Joulaei and colleagues have delineated significant challenges in the context of breast and cervical cancer diagnosis and treatment among women in Iran. These challenges encompass the absence of a comprehensive national diagnostic protocol for cancer, a lack of information in this domain, limited accessibility to healthcare services, financial constraints, spousal procrastination, inadequate distribution of mammography facilities across the country, and the elevated cost associated with the highly effective mammography diagnostic test. In the sphere of cervical cancer, they have highlighted the underutilization of screening tests by most women. The authors propose several recommendations to address these issues, including these diagnostic tests within insurance coverage, establishing a comprehensive national protocol for these conditions, and providing specialized training for healthcare personnel in these areas [52]. This comprehensive analysis underscores the multifaceted challenges in cancer care and the need for targeted interventions to improve women's health outcomes in Iran.

A call for tackling Iran's cancer care gaps

Comprehensive investigations encompassing the evaluation of medical equipment, healthcare facilities, and the availability of expert medical personnel are conspicuously scarce, and the duration of some of these examinations is notably extended. For instance, our study reveals that approximately 15 years have elapsed since the last comprehensive assessment of the number of cancer surgeons in Iran. A substantial predicament looms large in this context, giving rise to considerable costs and, at times, the suboptimal allocation of resources. This challenge emanates from the lack of provincial-level investigations, resulting in an incomplete understanding of the equipment and expertise available in each region of the country concerning cancer treatment. This knowledge gap has twofold implications. Firstly, it hampers the ability of the referral system to accurately guide patients to appropriate treatment centers accurately, thereby incurring increased costs and delays for patients. These factors have a profound impact on cancer survival statistics. Secondly, the health system and policymakers need more information to make well-informed decisions, thereby hindering the achievement of optimal resource allocation, efficiency, and equity in the healthcare system. The foremost achievement of the present study lies in its aspiration to rectify this situation.

In terms of the referral system, there remains a striking lack of precise and comprehensive information regarding its structure and functionality in the context of cancer care across Iran. Critical aspects such as the types of referral pathways, their geographic distribution, accessibility to patients in both urban and rural areas, and, most importantly, the efficiency of these systems are insufficiently documented. This absence of clarity poses significant challenges for health policymakers, clinicians, and patients alike, as effective referral systems are central to ensuring timely diagnosis, appropriate treatment, and continuity of care. Alongside these systemic gaps, there is also a pressing need for more rigorous research on the role and effectiveness of personalized educational initiatives aimed at the general population. Evidence from advanced nations consistently highlights the pivotal role of such interventions in improving awareness, promoting early detection behaviors, and ultimately reducing incidence while enhancing survival rates, particularly in breast cancer. In Iran, however, the available research remains fragmented and incomplete. The studies conducted so far have largely been limited to specific provinces or local populations, and their scope is often restricted to evaluating the proportion of individuals who are merely familiar with cancer-related educational programs. Moreover, the majority of these studies rely on cross-sectional methodologies, which provide only a snapshot of awareness levels without offering deeper insights into long-term behavioral changes, adherence to screening practices, or

measurable effects on cancer morbidity and mortality. Considering the paramount importance of this issue, there is an urgent need to move beyond descriptive analyses and to design comprehensive, longitudinal, and quantitatively robust studies. Such research should aim not only to evaluate the effectiveness of educational programs but also to directly measure their impact on cancer incidence, stage at diagnosis, and survival outcomes in the Iranian population. Addressing these gaps represents a critical step toward developing evidence-based strategies that can meaningfully advance the nation's cancer prevention and care policies, ensuring a more equitable, efficient, and patient-centered healthcare system.

Conclusion

Policymakers must address the challenges of diagnosing and treating diseases in developing countries like Iran. Access to healthcare services remains difficult in Iran, making understanding the obstacles essential and developing a comprehensive plan necessary. Despite a lower per capita healthcare budget for cancer patients compared to developed nations, a pragmatic strategy to reduce the cancer burden involves understanding the distribution of cancer types and their prevalence relative to risk factors. This data-driven approach is crucial for decision-making, enabling targeted interventions in regions with higher cancer incidence rates and efficient resource allocation to mitigate the impact of cancer on the population.

Acknowledgments

We thank Mazandaran University of Medical Sciences for their support.

Authorship

All authors contributed to the study's design, data analysis, manuscript drafting, and critical revisions, approved the final version for submission, and accepted accountability for the work.

Conflicts of interest

The authors declare they have no conflicts of interest.

Funding

This study received no funding.

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