

RESEARCH ARTICLE

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Key Determinants Shaping Cancer Prevention Policy Governance in Iran

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Abstract

Objective: Cancer prevention policy (CPP) plays a vital role in reducing the cancer burden, but it poses considerable challenges in health systems with limited resources and disparities in service access. Understanding the drivers, processes, and barriers influencing CPP governance is critical to designing equitable and effective interventions, particularly in low- and middle-income countries, such as Iran. **Methods:** This qualitative study employed a case study approach to investigate the complex social and systemic factors shaping cancer prevention policy (CPP) governance in Iran. Data were collected through 25 semi-structured interviews with key stakeholders and an extensive review of 47 relevant documents. Participants were purposively selected from government agencies, academic institutions, NGOs, and cancer specialty centers. Data analysis combined deductive and inductive content analysis, facilitated by ATLAS.ti, to identify themes related to actors, processes, and contextual influences. **Results:** Findings revealed that CPP governance is influenced by a network of domestically and internationally trained specialists, institutional leadership from the Ministry of Health, academic bodies, and civil society. Political, economic, and socio-cultural contexts significantly affected policy priorities and resource allocation. Challenges included insufficient needs assessments, fragmented stakeholder collaboration, and tensions between the growth of specialization and equitable access. Public demand for cancer prevention services remained low due to limited awareness and accessibility. Workforce shortages and cost constraints further complicated program implementation. **Conclusion:** Successful CPP governance requires inclusive participation, evidence-informed decision-making, and the adaptive integration of international expertise with local realities.

Keywords: Cancer Prevention Policy- Health Policy Development- Resource-Limited Settings- Iran

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Introduction

Cancer remains a major public health challenge worldwide, and its growing burden particularly strains health systems in low- and middle-income countries (LMICs) such as Iran. Globally, comprehensive cancer control programs including prevention, early detection, treatment, and palliative care have demonstrated the potential to reduce cancer mortality and improve population health outcomes [1, 2]. However, the effective development and implementation of cancer prevention policies require careful consideration of local contexts, resource limitations, and health system capacities. Iran faces an increasing incidence of cancer, driven by demographic transitions including aging populations and lifestyle changes. Recent national estimates project a continuing rise in cancer cases, emphasizing the urgency of strengthening preventive measures [3, 4]. Despite progress, cancer prevention in Iran is challenged by fragmented service delivery, limited public awareness, and inequities in access to quality care, which mirror barriers common to many LMICs [5, 6].

National Cancer Control Programs (NCCPs), as advocated by the World Health Organization, offer strategic frameworks tailored to country-specific needs and resources and emphasize multisectoral collaboration, evidence-based planning, and sustainable resource allocation [7]. Iran's efforts to formulate and operationalize its CPP strive to align international best practices with systemic realities by engaging stakeholders across government, academia, and civil society. The ongoing challenge remains to balance specialization and scientific advancement with equitable access to priority cancer prevention services, avoiding disproportionate investment in tertiary-level care that may deepen disparities. Given this complex landscape, there is a pressing need to explore the social, political, and institutional determinants influencing CPP governance in Iran. Understanding these factors will inform policy refinement to enhance effectiveness, inclusivity, and equity. This study employs qualitative methods to examine the key actors, processes, and contextual conditions shaping Iran's CPP, providing insights that are valuable for similar settings aiming to improve cancer preventive interventions amid constrained

resources.

Prior studies have examined aspects of cancer prevention policy governance, offering foundational insights into program development and implementation challenges. For instance, Motlagh et al. [8] detailed the formulation of Iran's National Cancer Control Program (IrNCCP), a comprehensive strategic framework spanning 2013–2025, which integrates four core components: prevention, early detection, diagnosis and treatment, and supportive/palliative care with seven supporting elements, including governance and policy-making, resource management, and multisectoral participation. Through document reviews, focus group discussions, and expert panels, they emphasized the need for a national cancer control center and legal reforms to address implementation gaps, highlighting how only 10% of WHO member states fully fund and execute such plans. Similarly, Pirani et al. [9] applied the Walt and Gilson policy triangle model to analyze cervical cancer prevention policies within Iran's IrNCCP, identifying key challenges across content (e.g., weak health technology assessment integration), process (e.g., inadequate monitoring), context (e.g., intersectoral fragmentation), and actors (e.g., conflicting interests among stakeholders). Their qualitative interviews with 43 experts and managers revealed socioeconomic and cultural barriers, recommending targeted funding and public awareness strategies to boost screening uptake.

In contrast, research from other LMIC contexts, such as Bakhturidze et al. [10] on tobacco control governance in Georgia and Allen et al. [11] on noncommunicable disease (NCD) policy implementation in five low-income countries, provides comparative perspectives on institutional determinants. Bakhturidze et al. [10] utilized a multiple streams framework to map policy windows and actor coalitions in Georgia's tobacco prevention efforts, underscoring political leadership and fiscal incentives as drivers of progress amid resource constraints. These works collectively illuminate governance enablers and barriers in diverse settings, from strategic planning in Iran to actor-network dynamics in Eastern Europe and sub-Saharan Africa.

The present study advances this literature by focusing specifically on the governance of Iran's comprehensive cancer prevention policy (CPP), rather than overarching NCCPs or disease-specific subsets like cervical cancer. Unlike Bakhturidze et al. [10], who examined tobacco control through a streams lens in a single non-Iranian LMIC, or Allen et al. [11], who adopted a cross-country, mixed-methods approach to NCDs broadly, our qualitative inquiry employs thematic analysis of in-depth interviews with Iranian CPP stakeholders to unpack social, political, and institutional determinants in real-time policy operationalization. This context-specific emphasis on prevention governance emphasizing actor interactions and equity trade-offs within Iran's unique federalized health system fills a critical gap, offering actionable insights for LMICs navigating similar tensions between global standards and local realities, thereby enhancing the evidence base for inclusive policy refinement.

Materials and Methods

This study adopted a qualitative case-study design underpinned by qualitative content analysis with a hybrid deductive–inductive approach. The analysis was guided by core concepts from health policy analysis particularly actors, processes, and context while allowing new themes to emerge directly from the data. In this study, “cancer prevention” refers to population-level policies and interventions aimed at reducing cancer incidence through primary prevention (e.g., risk-factor reduction such as tobacco control, vaccination, and health promotion) and secondary prevention (e.g., organized screening and early detection programs), whereas “cancer care” encompasses diagnostic confirmation, curative treatment, rehabilitation, survivorship support, and palliative/end-of-life care. This distinction is critical because governance challenges in prevention policy are fundamentally different from those in cancer care: prevention requires sustained multisectoral coordination, long-term political commitment, behavior-change interventions, and equity-oriented resource allocation across healthy populations, whereas care delivery is predominantly centered on clinical pathways, specialized infrastructure, and provider networks. By explicitly focusing on prevention policy governance rather than the broader domain of cancer care, the present study justifies its qualitative, actor-centered methodological approach, which is designed to capture the complex social, political, and institutional dynamics that shape upstream preventive strategies in a middle-income setting. This study employed qualitative research methods to deeply explore the complex social and systemic processes involved in establishing CPP in Iran. Recognizing that policy development is a multifaceted phenomenon influenced by diverse actors and resource constraints, a case study approach was adopted to capture the nuanced dynamics shaping CPP governance within a health system challenged by limited resources and disparities in access.

The lead author (MGh, PhD in Geopolitics, male) conducted all interviews. He has over 8 years of experience in qualitative health policy research in Iran and a known academic interest in health governing and policy-making. Reflexivity was maintained through reflexive memo-writing throughout data collection and analysis, and peer debriefing sessions were held with co-authors and external qualitative researchers. The lead author (MGh) conducted all interviews. No relationship had been established with any of the participants prior to study commencement. Participants were informed of the researcher's professional background and the study objectives during the initial telephone or in-person briefing. Before agreeing to participate, all potential participants were informed – either by telephone or during a brief in-person meeting – that the researcher (MGh) is a health policy researcher at Tehran University whose research partially focuses on governance and policy in non-communicable disease prevention in Iran. They were explicitly told that the purpose of the study was to understand the actors, processes, and contextual factors that have shaped Iran's cancer prevention policy, with the ultimate goal of generating evidence that can contribute

to more effective, equitable, and resource-appropriate prevention policies in Iran and similar middle-income settings. No other personal goals or incentives were shared. The interviewer (MGh) is a health policy researcher and PhD candidate with a pre-existing academic and professional interest in health equity, resource allocation challenges in low- and middle-income countries, and the governance of non-communicable disease prevention programs. He holds the working assumption that over-emphasis on tertiary care and excessive specialization in resource-constrained systems can exacerbate inequities an assumption derived from prior research and literature on health system strengthening in Iran and similar settings. The researcher was aware of this potential bias and addressed it throughout the study by (a) maintaining a reflexive journal documenting personal assumptions after each interview, (b) discussing emerging findings in regular peer-debriefing sessions with co-authors and two external qualitative researchers who do not share the same equity-focused lens, (c) actively seeking and prominently reporting divergent or contradictory viewpoints from participants who favored greater specialization, and (d) triangulating interview data with documentary evidence. These steps were taken to minimize the influence of the interviewer's prior beliefs on data collection, analysis, and interpretation.

Data Collection

Participants were selected using a combination of purposive sampling and snowball sampling. Purposive sampling was used first to intentionally recruit individuals with substantial experience and strategic roles in cancer prevention policy in Iran from the key stakeholder organizations listed in Table 1. Snowball sampling was subsequently employed whereby initial participants were asked to recommend additional key informants who had been centrally involved in the development or governance of cancer prevention policy but who might not have been immediately identifiable through official organograms. Data were collected through 25 semi-structured interviews [12] and a comprehensive review of 47 relevant documents. Participants were purposively and snowball-sampled from experienced individuals across key organizations engaged in cancer prevention in Iran: the Cancer Department of the Ministry of Health and Medical Education (MOHME), the Non-Communicable Diseases Prevention and Control Group at Tehran University of

Medical Sciences, the Iran Cancer National Network of NGOs and Charities, MAKSA NGO, the Cancer Research Institute of Tehran University of Medical Sciences, board members from Barkat Specialized and Subspecialized Cancer Hospital, and active academic faculty members in this field. Data collection spanned from October 2024 to March 2025. Five interviews were excluded due to incomplete data or insufficient responses, resulting in 25 interviews from 22 respondents (see Table 1). Repeat interviews were carried out with three participants to explore emerging themes in greater depth; this resulted in a total of 25 interviews with 22 individuals. No eligible individuals formally refused to participate. Five interviews were initiated but subsequently excluded from the final sample because of significant technical problems with the audio recording (n=2) or because the participant provided only very brief and superficial responses that did not yield usable data (n=3). These five interviews were therefore not counted among the final 25 interviews or 22 participants. We should also declare that no one besides the participant and the researcher was present during the interviews. All 22 participants were senior-level experts with direct involvement in the governance, planning, or implementation of cancer prevention policy in Iran. They included high-ranking officials from the Ministry of Health and Medical Education, academic leaders in public health and oncology, directors of major cancer-related NGOs, and clinical/academic board members of a leading specialized cancer hospital. All had at least 10 years of professional experience in the field (most considerably more). Exact age and gender were not systematically recorded because they were not relevant to the policy-focused research question and could have reduced anonymity in this small, elite national expert community.

Prior to the interviews, research objectives were communicated via phone or in-person briefings, assuring adherence to rigorous ethical standards. An evolving interview guide facilitated semi-structured discussions focused on participants' perceptions of the key factors, processes, and challenges involved in CPP, emphasizing contextual resource constraints and equity considerations. Three pilot interviews informed guide expansion, complemented by two additional pilots integrating emergent themes [13-15]. Data collection continued until thematic saturation was achieved, that is, until no new themes or sub-themes relevant to the governance of cancer prevention policy emerged in successive interviews, as

Table 1. Interview Participants by Organizational Affiliation

Organizational Grouping	Number of Respondents
Cancer Department, MOHME	3
Non-Communicable Diseases Prevention and Control Group, Tehran University of Medical Sciences (TMMS)	3
Iran Cancer National Network of NGOs & Charities	2
MAKSA Non-Governmental Organization	3
Cancer Research Institute, TMMS	3
Board Members, Barkat Specialized & Subspecialized Cancer Hospital	5
Faculty Members	3
Total	22

judged by the lead researcher in consultation with the co-author.

Interview Questions

- Who were the principal actors in CPP governance, and what roles did they fulfill within resource-limited settings?
- Which organizations and networks effectively collaborated or faced barriers in CPP creation?
- How did institutional power dynamics and perspectives shape policy advancement?
- What were the motivations and challenges behind establishing CPP amidst competing health sector priorities?
- How did the policymaking process unfold pragmatically, considering systemic resource limitations?
- What mechanisms validated and operationalized CPP initiatives at different levels?

A semi-structured interview guide containing open-ended questions and follow-up prompts was developed by the research team. The guide was pilot-tested with five initial interviews; feedback from the first three pilots led to refinement of wording and addition of probes, and two further pilots confirmed that no additional major changes were needed. Written informed consent was secured either during the initial briefing or immediately before interviewing. All interviews were conducted face-to-face, audio-recorded, and lasted between 35 and 50 minutes. Comprehensive verbatim transcripts were shared with participants for verification, and participants were invited to suggest corrections to enhance data accuracy and trustworthiness. Data collection continued until thematic saturation was achieved [16]. Participant anonymity was strictly preserved throughout the coding and reporting process, irrespective of organizational role. All verbatim transcripts were returned to the respective participants by secure email or in person. Participants were invited to review the transcript, correct any inaccuracies, and add or clarify points if they wished. Several participants made minor corrections or added short clarifications; these revised versions were used for the final analysis. Nevertheless, full findings (summary of major themes with supporting quotations) were not formally returned to all participants for final validation due to time constraints and the elite, high-workload status of the interviewees. However, during the three repeat interviews and informal follow-up contacts with six participants, the researcher presented emerging themes and received confirmatory or clarifying feedback, which was incorporated into the final analysis. Additionally, one participant who holds a senior position in the Ministry of Health reviewed a near-final draft of the results section and confirmed that the themes accurately reflected the policy realities as understood within the governance circle. Documentary sources were selected based on participant recommendations, targeted searches of the Ministry of Health website, and existing literature on Iran's cancer prevention trajectory. These included meeting minutes, educational curricula, policy papers, and historical analyses, providing triangulated evidence to contextualize and corroborate the interview findings.

Analysis

Data were managed and analyzed using Atlas.ti (version 7.57) following a qualitative content analysis approach designed to generate contextually grounded insights. The interviewer, who also transcribed the audio recordings, maintained prolonged immersion in the dataset to ensure nuanced interpretation. The interviewer wrote brief field notes immediately after each interview, documenting contextual observations, non-verbal cues, tone of voice, emerging reflections, and any methodological decisions made in the moment. A hybrid deductive–inductive coding process was employed: meaning units were identified within transcripts and documents, abstracted into codes reflecting policy actors, processes, and contextual dynamics relevant to system constraints and equity considerations, and subsequently grouped into subcategories and overarching themes based on patterns of similarity and difference. Thematic coding of the full dataset was performed primarily by the lead researcher (MGh). A second coder (SMI) independently coded a subset of 8 transcripts ($\approx 32\%$ of the data) to enhance reliability. Additionally, two independent coders quantitatively rated the influence of key actors on a 1–4 scale (as reported in the Methods and used to inform the stakeholder analysis). Discrepancies in both thematic codes and influence scores were resolved through discussion until consensus was reached. Reliability and validity were strengthened through peer debriefing, member-checking, and triangulation of interview and documentary data [17, 18]. Ethical protocols encompassed informed consent, confidentiality, voluntary participation, bias mitigation measures, and rigorous safeguarding of anonymity. A visual representation of the final coding tree and thematic structure is provided in Figure 1. Themes were derived primarily inductively from the data using a hybrid deductive–inductive approach: initial broad categories (stakeholders/actors, policymaking process, contextual factors) were informed deductively by established health policy analysis frameworks, while all sub-themes and the final detailed thematic structure emerged inductively through iterative reading and open coding of the transcripts and documents. Key actors' influence on the establishment of the CPP was quantitatively assessed by two independent coders using a 1-to-4 scale (1 = lowest influence, 4 = highest influence), with any discrepancies reconciled through discussion grounded in textual evidence.

Participant quotations are presented throughout the Results section to illustrate each major and minor theme. Every quotation is identified by a unique participant number (e.g., P.7, P.13, P.21) to maintain anonymity while allowing the reader to trace the source within the anonymized sample.

Limitations

As with all qualitative case studies, this research has inherent limitations that should be considered when interpreting the findings. First, the study is deliberately bounded to the specific context of cancer prevention policy development in Iran, a middle-income country

with unique institutional, economic, and cultural characteristics. While this in-depth, context-specific focus enabled a rich understanding of policy processes within a resource-constrained health system, it necessarily limits direct transferability of the findings to other countries or health policy domains without further comparative research. Second, although purposive and snowball sampling successfully recruited highly experienced stakeholders from key national-level organizations, the sample may not fully capture perspectives from provincial or grassroots implementers, or from actors outside the dominant policy networks. This reflects both practical access constraints and the elite nature of national policy formulation processes. Third, reliance on retrospective accounts in interviews introduces the possibility of recall bias, particularly when participants reflected on events spanning several years. Although this was partially addressed through triangulation with contemporaneous documents and member-checking of transcripts, some nuances of historical sequencing or informal interactions may remain incompletely captured. Finally, the involvement of the lead researcher (MGh) as both interviewer and primary analyst, while enhancing interpretive depth through prolonged engagement with the data, raises the potential for researcher bias. Rigorous strategies including peer debriefing, independent co-coding, reflexive memo-writing, and systematic triangulation were employed to minimize this and enhance transparency around this influence. These limitations are typical of in-depth qualitative policy research and do not compromise the internal validity or credibility of the findings within the Iranian context. Rather, they highlight opportunities for future studies to adopt complementary methods (e.g., longitudinal designs, broader geographic sampling, or mixed-methods approaches) to build upon the present work.

Results

There was strong consistency between the raw data (interview quotations and documentary evidence) and the reported findings; all themes and sub-themes are directly supported by multiple participant quotations and, where relevant, triangulated with documentary sources. Within each major theme, minor themes, divergent viewpoints, and contrasting cases (e.g., participants who strongly favored rapid specialization versus those who prioritized equity and primary prevention, differing perceptions of NGO influence, and generational differences among returning specialists) are explicitly described and illustrated with quotations to reflect the full range of perspectives in the data. Analysis yielded three primary, interrelated themes reflecting the complexity of CPP governance within Iran's challenged health system: (A) stakeholders actors' roles, perceptions, power, and influence; (B) policymaking process mechanisms, gaps, and resource-related constraints; and (C) contextual factors facilitators and barriers shaped by socio-political, economic, and structural conditions (see Figure 1).

Stakeholders

Return of Abroad-Trained Specialists: Catalysts Within Constraints

Participants identified government-sponsored specialists (in fields or disciplines such as oncology, preventive medicine, public health and epidemiology) trained abroad as critical initiators of CPP, bringing international expertise aligned with global best practices while needing adaptation to Iran's resource realities.

"These specialists, returning with scholarships funded by the government, formed the foundation of CPP despite limited domestic infrastructure." (P.13)

Their dual roles in administration and science facilitated policy advancement, leveraging credibility from prestigious institutions while navigating systemic

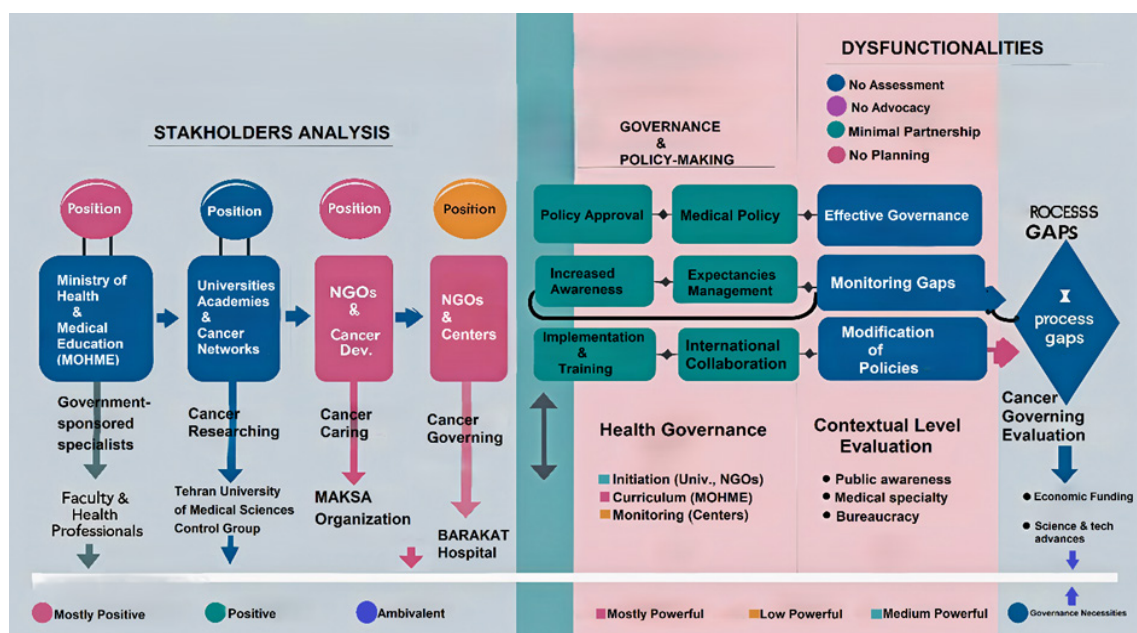


Figure 1. Comprehensive Factors Influencing Cancer Prevention Policy in Iran

resource shortages.

“Holding executive roles allowed implementation of their vision, balancing ideal frameworks with practical limitations.” (P.7)

Key Organizations: Strategic Anchors

The Cancer Department at MOHME and academic health institutions provided institutional leadership, yet collaboration gaps and resource competition constrained unified action.

“These bodies structured strategic direction, but resource scarcity required prioritization, sometimes limiting the breadth of prevention initiatives.” (P.9)

Ministry of Health and Medical Education

MOHME held primary responsibility, balancing ambitions for CPP expansion with real-world fiscal limits and system capacity challenges. The highest policy authority sought to ensure human resource planning aligned with sustainable cancer prevention goals.

“MOHME evaluates educational needs carefully, mindful of maintaining access and avoiding over-specialization that can exacerbate inequities.” (Document 1)

Government Support and Limitations

Pre-revolutionary governmental backing was crucial for policy inception, particularly in securing financial resources and legitimization. However, political and economic fluctuations subsequently complicated sustained support.

“Without political endorsement and budgets, CPP establishment would have stalled, but ongoing funding remains a delicate negotiation.” (P.12)

Scientific Associations and NGOs

NGOs and scientific networks were instrumental in advocacy and capacity-building. Their informal structures enabled flexibility but also faced challenges integrating with formal health system priorities.

“These groups championed prevention, yet sometimes lacked the influence to fully embed CPP into national health strategies.” (P.4)

Resistance from established medical cancer prevention specializations highlighted professional turf conflicts, underscoring the need to strategically balance specialization with system-wide equity.

“Some cancer prevention specializations resisted CPP, fearing resource diversion in a system already stretched thin.” (P.21)

Public Awareness and Service Demand

Early low public awareness and limited demand reflected broader resource and access limitations, emphasizing the importance of tailored education and equitable service distribution rather than indiscriminate expansion.

“People prioritized basic health needs; cancer prevention services were inaccessible or unfamiliar at grassroots levels.” (P.9)

Stakeholders' Perceptions

Educational Reform and Adaptation

Returning specialists adapted overseas models to local realities, promoting education reforms designed to improve quality without overextending scarce resources.

“They modeled improvements carefully, avoiding simply duplicating foreign systems that may not fit Iran's unique constraints.” (P.10)

Scientific Competition vs. Collaborative Planning

Universities aimed for competitive excellence but confronted tensions between expanding cancer prevention specialization and maintaining equitable, accessible services.

“Striving to match global standards prompted growth, but without coordinated planning, this risked resource dilution.” (P.9)

Professional Incentives and Conflict

While specialization provided professional growth and incentives, overlapping scopes triggered intermittent conflicts, complicating holistic cancer prevention efforts in a resource-limited setting.

“Disputes emerged over jurisdiction and funding, diverting attention from unified prevention goals.” (P.3)

International Attraction Balanced with Domestic Priorities

CPP curricula were designed to draw international students as part of scientific positioning; however, interviewees emphasized the imperative of aligning training with domestic healthcare system needs and equitable service access.

“Growth must be balanced; attracting foreign trainees should not compromise addressing local gaps.” (P.20)

Governmental Commitment Amid Constraints

The government demonstrated a clear vision for scientific progress but had to carefully weigh CPP expansion against competing urgent healthcare needs and inequities.

“Scientific advancement was prioritized but not at the cost of widening service access inequalities.” (P.15)

Workforce Training and Resource Limitations

Shortages of trained health professionals necessitated pragmatic workforce plans emphasizing both general practitioner capacity-building and specialized training without excessive reliance on tertiary-level specialists.

“Local language skills and cultural competence are as vital as specialization in a constrained system.” (P.7)

Cost Control and Program Regulation

MOHME expressed concerns about unchecked cancer prevention specialization proliferation due to budgeting constraints, highlighting the need for deliberate policy controls aligned with equity and access objectives.

“Once cancer prevention specialization proliferates, containing costs and ensuring equitable distribution become increasingly difficult.” (P.6)

Policy Process and Identified Gaps

The CPP governance process initially lacked systematic needs assessments and robust stakeholder engagement, leading to decisions often made prematurely, potentially undermining equitable outcomes and efficient resource use.

“Early policies advanced without sufficient evaluation, risking misaligned priorities and resource misallocation.” (P.13)

Limited collaboration among actors and inadequate career planning underscored governance weaknesses in balancing system-wide equity with specialized service expansion.

“Fragmented decision-making reduced policy coherence and responsiveness to real population needs.” (P.17)

MOHME and major universities dominated governance structures, while foreign-trained specialists and NGOs had comparatively less influence, reflecting challenges in inclusive policymaking within resource constraints.

Contextual Factors Influencing CPP

Cultural Trends and Social Aspirations

Growing social preference for specialization reflected desires for higher education and status but required reconciliation with population-level needs and resources.

“Specialization became attractive professionally, yet widespread access remained limited due to systemic constraints.” (P.8)

Political and International Influences

Historical diplomatic relations shaped CPP models, but local adaptation was essential to ensure sustainability within Iran’s evolving political and economic landscape.

“Adopting foreign frameworks necessitated contextual tailoring to address systemic shortcomings.” (P.11)

Political Transitions and Conflict

The 1979 revolution and Iran-Iraq War disrupted educational infrastructure and human resource stability, increasing demand for prevention while further straining limited health system resources.

“Conflict heightened prevention needs but also reduced capacity, underscoring the importance of balanced policy approaches.” (P.10)

Economic Flux and Resource Dependence

Revenue surges from oil wealth facilitated early CPP investments and scholarship funding, but economic volatility imposed continuing constraints requiring prudent resource allocation.

“Economic conditions shaped opportunities but also imposed limits on sustained policy expansion.” (P.14)

Technological and Disciplinary Advances

Implementing new technologies and educational techniques propelled specialization growth but mandated careful balancing with primary and secondary prevention emphases to ensure equitable care access.

“Technological progress enriched CPP but risked diverting attention from foundational, accessible

services.” (P.15)

Professional Identity and System-wide Equity

While developing a distinct professional identity was a key motivator, interviewees emphasized the need to prevent resource-driven competition from undermining equitable cancer prevention coverage.

“Establishing identity should not deepen health disparities but foster integrated, accessible care.” (P.14)

Structural Separation and Integrated Service Delivery

Splitting joint departments facilitated specialization but required robust coordination mechanisms to maintain seamless service delivery and prevent fragmentation that disproportionately impacts marginalized populations.

“Structural independence allowed growth but needed governance to avoid service silos worsening inequalities.” (P.18)

Discussion

This study provides a detailed examination of the multifactorial influences shaping the development of CPP in Iran, underscoring the complex interplay of contextual, institutional, and actor-driven factors within a resource-constrained health system. To elucidate the governance complexity, we outline key stakeholders and their roles: (1) the Ministry of Health and Medical Education (MOHME) and its Cancer Department, serving as primary policy authorities responsible for strategic direction, resource allocation, and regulatory oversight while balancing ambitions with fiscal and equity constraints; (2) abroad-trained specialists in oncology, preventive medicine, public health, and epidemiology, acting as catalysts who introduce global expertise, hold dual administrative-scientific roles, and adapt international models to local realities; (3) academic health institutions and universities, driving educational reforms, competitive excellence, and workforce training but facing tensions in equitable resource distribution; (4) scientific associations and non-governmental organizations (NGOs), providing advocacy, capacity-building, and flexible support yet often limited in formal influence; (5) the broader government, offering political endorsement and funding (historically crucial pre-revolution) amid economic fluctuations; (6) established medical specializations in cancer prevention, which may resist expansion due to professional turf conflicts and resource competition; and (7) the public, whose low awareness and demand underscore needs for tailored education and accessible services. These stakeholders interact dynamically through collaboration, competition, and power imbalances shaping policy implementation and highlighting governance gaps in inclusive decision-making.

Our findings align with the broader global discourse on national cancer control initiatives, as documented in studies examining cancer policy landscapes and their impact on cancer outcomes [19-21]. Consistent with global trends outlined by Romero, et al., [2] in *The Lancet Oncology*, the development of CPP in Iran is profoundly shaped by socio-political and economic contexts. Political

affiliations and historical ties with Western countries facilitated the adoption and adaptation of international cancer prevention frameworks, reflecting a common pattern where emerging economies seek to align their policies with established global standards to accelerate scientific capacity and care quality. However, as noted by Mahase [22], such international influences must be critically adapted to domestic realities to avoid policy misalignment, an issue echoed in our Iranian context where systemic resource shortages necessitate pragmatic customization rather than wholesale adoption.

A regional parallel emerges from Alessy et al. [20], who examined cancer control governance in Saudi Arabia a context sharing Middle Eastern socio-cultural and economic traits with Iran, including oil-dependent revenues and centralized health ministries. Both studies reveal common challenges, such as resource competition among stakeholders (e.g., MOHME equivalents and academic bodies prioritizing fiscal limits over expansive specialization) and low public awareness hindering prevention uptake. Yet, distinctive factors differentiate trajectories: Iran's CPP evolution was disrupted by the 1979 revolution and Iran-Iraq War, amplifying equity gaps and necessitating post-conflict workforce rebuilding, whereas Saudi Arabia's Vision 2030 drives accelerated investments in abroad-trained specialists and NGOs for integrated care, potentially mitigating fragmentation more effectively [20]. This comparison underscores shared imperatives for inclusive policymaking to address inequities, while highlighting how Iran's historical volatility demands tailored resilience strategies, enhancing the transferability of lessons across the region.

The pivotal role of specialists trained abroad particularly in oncology, preventive medicine, and public health—parallels findings from the International Cancer Benchmarking Partnership [23-25], whereby transnational expertise catalyzes policy innovation but requires strategic integration within local capacities [26, 27]. Their dual scientific and administrative functions bolster policy legitimacy while navigating constraints related to infrastructural inadequacies and limited human resources [28, 29].

Institutional leadership primarily vested in MOHME and academic bodies aligns with global understandings of effective governance in cancer control, which emphasize centralized stewardship balanced by inclusive stakeholder participation [30-32]. Nonetheless, challenges remain in ensuring cohesive collaboration among state actors, NGOs, and civil society, which also illustrates how fragmented governance can attenuate the impact of national cancer policies on survival outcomes and exacerbate socio-economic disparities [33-35].

Our study confirms that public awareness and demand for cancer prevention services remain underdeveloped, reflecting patterns seen internationally where low health literacy and inequitable access hinder prevention uptake [36-38]. This scenario highlights the urgency of prioritizing equitable, cost-effective interventions at primary and secondary care levels rather than over-concentrating resources on tertiary services that risk widening inequities. This conclusion resonates with the

findings of Shah et al. [39], who emphasize that successful cancer control policies must address social determinants and health system factors enabling broad population access.

Professional incentives and specialization expansion within academic institutions aim to enhance scientific positioning and attract international learners, echoing global trends toward academic competitiveness [40-42]. However, our findings caution that without robust needs assessments and coordinated planning, such growth could strain limited health budgets and fragment services. Overlapping professional domains and funding rivalries mirror challenges discussed in international policy debates on specialization management [43, 44].

Pragmatic workforce development, including bridging specialist training with strengthening general practitioner competencies in cancer prevention, emerges as a strategic necessity given population demands and systemic capacities [45]. This approach aligns with recommendations from comprehensive cancer control policy analyses advocating balanced human resource development adapted to local constraints [46].

Finally, cost containment and program governance surfaced as critical policy imperatives in Iran, mirroring global experiences reported by the International Cancer Benchmarking Partnership and other policy evaluations. Explicit regulatory controls and continuous monitoring are essential to prevent unchecked specialty proliferation, optimize resource allocation, and ensure that cancer prevention initiatives effectively contribute to equitable health gains.

In conclusion, the construction and sustainment of Iran's Cancer Prevention Policy exemplify the intricate balancing act of advancing scientific excellence and specialization while conscientiously addressing health system limitations and equity goals.

Conclusion

The development of the CPP in Iran illustrates the intricate challenges of formulating effective health policy in a resource-constrained, socio-politically complex environment. This study demonstrates that successful policy emergence hinges on sustained interaction among diverse actors government institutions, academic centers, NGOs, and internationally trained specialists—who must continuously adapt global evidence to local realities. Contextual forces (political priorities, economic limitations, cultural norms, and historical legacies) profoundly shape policy trajectories, determining resource allocation, programmatic emphasis, and ultimate implementation success. A central insight is the need to balance investment in advanced, specialized cancer prevention and control services with the imperative of equitable access across socioeconomic and geographic divides. Overemphasis on tertiary-level specialization without robust population-based needs assessment risks widening disparities and diverting scarce resources from high-impact primary and secondary prevention.

Effective governance, inclusive stakeholder engagement, and mechanisms to reconcile competing interests emerge as critical enablers of policy coherence

and long-term sustainability. Continuous monitoring, transparent cost management, and evidence-informed regulatory frameworks are equally essential to ensure that specialization remains aligned with national capacities and public health priorities.

Nevertheless, several tensions and alternative interpretations warrant acknowledgment. First, while the study highlights the risks of unchecked specialization, it is equally plausible that concentrated investment in cutting-edge tertiary capacity could, under certain conditions (e.g., strong referral systems and parallel primary-care strengthening), generate spillover benefits such as enhanced training, technological diffusion, and improved outcomes for complex cases benefits that might indirectly support prevention efforts. The Iranian experience to date offers limited evidence to definitively resolve this trade-off.

Author Contribution Statement

MGh: conceptualization, methodology, investigation, formal analysis, software, writing – original draft, writing – review & editing, supervision. SMI: validation, data curation, writing – review & editing. Both authors have read and agreed to the published version of the manuscript.

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These unresolved questions and competing possibilities underscore the inherently contingent nature of health policy success in resource-limited settings. Rather than offering a universal blueprint, the Iranian case provides a nuanced framework that invites adaptation and critical testing elsewhere. Future research should employ longitudinal and comparative designs to better disentangle the conditions under which specialization complements rather than compromises equity, and to identify governance arrangements that maximize inclusion

while preserving decisiveness and accountability.

How the ethical issue was handled

All participants provided written informed consent. Although the study deals with policy experts and no personal health data were collected, formal ethical approval was obtained in line with institutional requirements.

Availability of data

The qualitative datasets generated and analyzed during the current study are not publicly available because they contain information that could compromise participant anonymity, but selected anonymized excerpts and the coding framework are available from the corresponding author on reasonable request.

Consent for publication

Author has given consent for publication.

Ethics approval

This research did not involve human subjects or any animal model; therefore, it was exempt from ethical clearance.

Conflict of interest

The author declares no potential conflict of interest.

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