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Assessing the development of health technology assessment in Iran: a policy analysis using Kingdon's Multiple streams framework: a qualitative study

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Abstract

Background Health Technology Assessment (HTA) is crucial for optimizing healthcare investments and improving system efficiency. In Iran, the rising costs of healthcare technologies and systemic inefficiencies have highlighted the need for a structured HTA framework. However, despite academic discussions, HTA has not yet been fully integrated into formal health policy. This study explores the development of HTA in Iran using Kingdon's Multiple Streams Framework to identify challenges and opportunities for its advancement.

Methods The study employed qualitative methods, including 16 semi-structured interviews with key stakeholders in Iran's healthcare system. Participants, consisting of 12 males and 4 females with an average age of 41.56 years and an average work experience of 14.37 years, provided insights into the current state of HTA. The participants included individuals in key leadership roles within public and private institutions, such as the Ministry of Health and Medical Education, hospital managers, policymakers, and senior academics. Data were analyzed using Kingdon's framework to examine the problem, policy, and politics streams, as well as the role of policy entrepreneurs and potential policy windows.

Results Findings revealed that the rising costs of healthcare technologies, particularly imported ones, and inefficiencies in technology use were major concerns. Participants indicated that HTA could address these issues by ensuring cost-effectiveness and better health outcomes. Despite the technical feasibility of implementing HTA in Iran, there is a significant gap between theoretical discussions and policy action. Resistance from the private sector and the need for political backing were identified as major barriers. However, the political climate in Iran is becoming increasingly favorable, with growing interest in healthcare efficiency and transparency. The Covid-19 pandemic and healthcare shortages have exposed vulnerabilities, presenting potential opportunities for HTA's adoption. Leadership roles in key institutions, including the Ministry of Health and Medical Education, were identified as vital to advancing HTA initiatives. Policy entrepreneurs play a crucial role in advocating for HTA and capitalizing on these opportunities.

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Conclusion HTA is recognized as a valuable tool for improving healthcare efficiency and equity in Iran. However, significant challenges remain in transitioning from academic discussions to formal policy. The political environment and recent healthcare crises offer opportunities to advance HTA. To successfully integrate HTA into Iran's healthcare system, it is essential to address existing barriers, leverage political interest, and support policy entrepreneurs. The experiences of other countries, especially those with strong institutional leadership in HTA, provide useful models for Iran to follow in its HTA development journey.

Keywords Health technology assessment, Iran, Kingdon's Multiple streams framework, Health policy, Policy entrepreneurs

Introduction

Health Technology Assessment (HTA) plays a critical role in the optimal allocation of health system resources by providing evidence-based evaluations of medical technologies, interventions, and procedures [1]. By ensuring that resources are directed toward the most effective and efficient health services, HTA promotes access to appropriate care and reduces the waste of limited funds [2]. It also supports increased health equity by prioritizing interventions that address the needs of underserved populations, contributing to fairer distribution of healthcare benefits [3]. Moreover, HTA is essential in achieving the goals of Universal Health Coverage (UHC), as it helps policymakers make informed decisions that balance cost, quality, and access to health services, ultimately leading to improved population health outcomes [4].

The development of HTA within a country's health system is essential for enhancing the efficiency and effectiveness of healthcare delivery [5]. HTA provides a structured framework for evaluating medical technologies, treatments, and health interventions based on evidence of their clinical benefits, cost-effectiveness, and societal impact. Its development is crucial for making informed decisions about resource allocation, and ensuring that the most effective technologies are implemented [6]. The establishment of HTA requires the creation of robust institutional frameworks, capacity building, and the integration of HTA processes into national health policy and decision-making [7]. This involves engaging stakeholders, including policymakers, healthcare providers, and the public, to ensure transparency and relevance. Activities such as standardizing evaluation methods, conducting research, and training professionals in HTA are necessary to achieve its successful development. Ultimately, developing HTA is vital for improving health outcomes, promoting health equity, and ensuring sustainable healthcare systems [8].

The implementation and development of HTA in Iran is vital given the challenges and complexities facing the country's health system [9]. Iran's healthcare system struggles with resource constraints, rising healthcare costs, and inequalities in access to medical services [10]. By adopting HTA, Iran can prioritize investments in cost-effective and evidence-based medical technologies,

ensuring the optimal use of its limited resources. HTA also addresses issues of inefficiency and waste by guiding policymakers to make informed decisions about which health interventions offer the greatest value [11]. Furthermore, in a system where health equity remains a concern, HTA can play a crucial role in improving access to essential healthcare services, especially for underserved populations. Developing HTA in Iran would foster a more sustainable, transparent, and equitable healthcare system, better equipped to meet the demands of its growing population [12].

Iranian health system

Iran's healthcare system is a mixed model that combines features of the Beveridge and Bismarck models. The government, through the Ministry of Health and Medical Education (MoHME), manages a significant portion of healthcare services [13]. Many primary healthcare services are provided free of charge or at low cost in public facilities, reflecting characteristics of the Beveridge model. Simultaneously, the insurance system relies on multiple insurance organizations (such as the Social Security Organization and the Iran Health Insurance Organization), with funding sourced primarily from premiums paid by individuals and employers, which aligns with the Bismarck model [14]. Iran has taken significant steps towards achieving UHC. Key initiatives include the implementation of the Health Transformation Plan (HTP) in 2014, aimed at reducing out-of-pocket payments and expanding health insurance coverage for uninsured populations, particularly in rural and underserved areas [15]. However, challenges such as inequities in access to services and limited financial resources remain critical issues for the healthcare system [16]. In the public sector, the primary responsibility for delivering healthcare services, particularly in underserved areas and preventive services lies with the government. The majority of hospitals and healthcare centers are publicly owned, and policy-making and oversight are carried out by the MoHME [17]. Conversely, the private sector focuses more on specialized services, advanced treatments, and outpatient care. These services are primarily concentrated in urban areas and tend to be more expensive, often covered by supplemental health insurance plans [18]. Collaboration between the public and private sectors is a notable feature of Iran's healthcare

system. For example, the private sector provides complementary services through contracts with insurers and the government, and in certain programs, both sectors work jointly (e.g., specialized treatments) [19]. However, challenges such as competition to attract high-income patients, lack of coordination in delivering integrated services, and dissatisfaction with the quality of some public sector services, which places additional pressure on the private sector, persist. These issues require structural reforms to enhance coordination and improve the quality of healthcare services [20].

HTA in Iran

HTA in Iran began in 2007 within the MoHME and later expanded to a dedicated department. Initially carried out by university faculty, it now involves trained professionals supported by capacity-building programs like workshops and a master's degree [11]. Over a decade, HTA has systematically evaluated technologies, focusing on areas like diagnostic devices and surgical equipment, with increasing project outputs [12]. Despite progress, challenges such as limited policymaker engagement and insufficient oversight remain as the system continues to evolve toward evidence-based healthcare decision-making [11].

This manuscript aims to address the critical question of whether the development of HTA is on the agenda-setting of Iranian policymakers and decision-makers. Given the resource constraints, rising healthcare costs, and persistent inequities within Iran's health system, understanding the extent to which HTA has been prioritized is essential. The study's importance lies in its potential to inform policy by highlighting the need for HTA as a strategic tool for improving healthcare efficiency, equity, and sustainability. Its findings could guide future efforts to integrate HTA into health policy frameworks, offering practical solutions for optimizing resource allocation, ensuring equitable access to health technologies, and ultimately enhancing the overall quality and sustainability of Iran's health system.

Methods

The theoretical framework

We applied Kingdon's Multiple Streams Framework to analyze the development of an HTA program. This framework enabled us to assess whether HTA has been prioritized as a policy agenda in Iran [21]. Kingdon's Multiple Streams Framework is a widely used theory in public policy, developed by political scientist John Kingdon [21]. It helps explain how certain issues come to the forefront of the policy agenda and how policies are created, especially in complex and unpredictable political environments. This framework is particularly useful for understanding how policies are formed in contexts where many actors and factors interact, such as healthcare,

environmental issues, and large-scale government programs [22].

The framework breaks down the policy process into three streams that must come together for a policy to be successfully adopted. These streams are:

Problem stream

This stream involves the recognition of problems that require governmental action. Problems can be identified through the following mechanisms:

Indicators Data or reports showing that something is wrong (e.g., high healthcare costs, rising unemployment rates).

Focusing events Events that draw attention to an issue, such as a health crisis, natural disaster, or financial crash.

Feedback Information from existing programs or policies showing that they are not working as expected [21].

Policy stream

This stream represents the pool of potential policy solutions. It includes ideas and proposals developed by policy experts, interest groups, and governmental bodies. For a solution to be considered seriously, it must meet the following criteria:

Technically feasible the solution must be implementable.

Politically acceptable The policy idea must have enough support from policymakers, stakeholders, and interest groups to be considered [21].

Politics stream

The political environment plays a major role in which problems and solutions are addressed. This stream is influenced by:

Political climate The current mood or ideology of the government and public.

Elections and leadership changes New political leaders can bring new priorities.

Interest groups and lobbying Groups that advocate for or against certain policies [21].

Policy window (coupling of streams)

The critical moment when the three streams—problem, policy, and politics—come together is called a policy window. This is a short-lived opportunity when policymakers can take action on an issue.

Policy entrepreneurs

These are individuals or groups who work to bring attention to certain problems and push their favored solutions. They play a key role in coupling the three streams. Policy entrepreneurs can be politicians, lobbyists, activists, or experts who invest time and effort into advocating for a particular issue [21].

Kingdon's Multiple Streams Framework shows that policy change doesn't happen simply because a problem exists. Instead, it happens when the problem, policy, and politics streams align, creating a window of opportunity. This alignment is often influenced by chance events, political shifts, and the work of policy entrepreneurs who navigate the complex political landscape. By understanding how these streams work together, policymakers and advocates can better strategize how to move their issues onto the policy agenda and increase the chances of successful policy adoption [23].

Study design and data collection

This study employed a qualitative design, utilizing in-depth semi-structured interviews to gather data. The collected data were analyzed using a content analysis framework, which facilitated the identification of patterns, themes, and key concepts about the HTA development agenda in Iran. This method allowed for a comprehensive exploration of the experiences and viewpoints of health professionals, providing valuable insights into the subject matter. We used the Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist to enhance the reporting and methodological quality of the study [24].

The interviews were conducted by MB and SS, researchers specializing in health policy and HTA. Both researchers are male. They hold PhDs in Health Policy with a focus on health policy analysis. At the time of the study, MB was an Assistant Professor at Lorestan University Medical Sciences, and SS was an Assistant Professor at Shiraz University Medical Sciences. Both researchers have over ten years of experience in qualitative research and have received training in advanced qualitative data analysis techniques. A professional rapport with participants was cultivated through previous academic collaborations and engagement in health policy forums alongside the researchers. Participants were informed that researchers focused on health technology assessment and policy analysis, including their motivations for exploring the development of HTA in Iran. The researchers acknowledged their prior involvement in health policy research and expressed their interest in improving HTA practices. To minimize potential bias, the researchers employed reflexivity techniques by actively reflecting on their assumptions and preconceived notions throughout the study. Efforts were made to remain neutral and objective throughout the study.

Participant selection and interview process

The study employed Kingdon's Multiple Streams Framework to analyze the agenda-setting process for health technology assessment in Iran. Purposive sampling was used to select participants to ensure representation from key stakeholders in the Iranian health system, including policymakers, healthcare providers, and researchers. Eligibility Criteria for participants were defined as follows:

Policy experts Individuals with experience in health policy development and HTA, including policymakers, directors of health programs, and healthcare administrators.

Health technology assessment specialists Professionals with direct involvement in the evaluation or application of HTA in Iran.

Academic researchers Scholars and experts from universities or research institutions with expertise in health policy, health economics, and HTA.

Decision-makers Those in positions of authority who are responsible for healthcare decision-making in Iran, particularly those with influence on the adoption of new health technologies.

In total, 16 experts were selected for the interviews. The selection aimed for diversity in professional background and sector representation (public sector, private sector, and academia). We excluded participants who did not have sufficient experience with HTA or who were not involved in policy or decision-making processes related to health technology.

Participants were approached via email invitations, followed by phone calls to schedule interviews. A total of 16 experts participated in the study. Three individuals initially contacted declined to participate due to scheduling conflicts and time constraints, and no participants dropped out during the study. Data collection was conducted in participants' offices or through virtual meetings via video conferencing platforms, depending on their availability and preferences. Only MB and SS, along with the participants, were present during the interviews.

The sample consisted of 16 experts, including health policymakers, technology assessment specialists, and academic researchers, with diverse professional backgrounds and expertise relevant to HTA. A semi-structured interview guide was developed based on Kingdon's framework and included questions on policy agendas, streams, and decision-making processes. The guide was pilot-tested with four experts to refine and clarify questions. No repeat interviews were conducted. All interviews were audio-recorded with the participant's consent to ensure accurate data capture. To complement the audio recordings, field notes were made during the

interviews, documenting non-verbal cues, contextual observations, and researcher reflections immediately after each interview. The interviews were conducted between March and June 2024.

Interviews lasted between 45 and 60 min each. Data saturation was reached when subsequent interviews did not reveal new themes, indicating comprehensive coverage of the research questions. Although transcripts were not returned to participants due to time constraints, the accuracy of the data was ensured through careful transcription and review by the research team.

Data analysis

The data analysis followed the Braun and Clarke approach, which involves several key steps [25]. First, familiarization with the data was achieved by thoroughly reading and re-reading the dataset. Next, initial codes were generated by systematically identifying notable features across the entire dataset. These codes were then organized into potential themes. The themes were subsequently reviewed, refined, and adjusted to ensure they accurately reflected the data. Once finalized, clear definitions and names were assigned to each theme. The final step involved producing the report, which integrated the identified themes with relevant data excerpts. This approach provides a structured method for organizing qualitative data, enabling researchers to uncover meaningful themes that contribute to broader insights and theoretical understanding.

Data coding was conducted by two independent coders (SA and AB) to enhance reliability and validity. A detailed coding tree was developed, outlining major and minor themes based on the iterative analysis of interview data. Themes were derived inductively from the data through a systematic process of coding and thematic analysis. Data analysis was facilitated using NVivo software (Version 12) to manage and organize qualitative data. Participants did not review the findings or provide feedback. However, to ensure the trustworthiness of the analysis, two coders worked independently and then compared their coding results to resolve any discrepancies.

Relevant quotes from participants were presented to illustrate key themes and findings, and each quote was identified by a participant number for clarity. The findings were consistent with the collected data, and a clear alignment was shown between the participants' responses and the identified themes. Major themes related to the development of HTA in Iran are presented and discussed in the findings section. Minor themes and diverse responses were included to capture the range of perspectives and provide a more nuanced understanding of the data.

Enhancing accuracy and trustworthiness

Several strategies have been employed to enhance the accuracy and trustworthiness of qualitative research by ensuring the findings are verifiable, valid, reliable, and transferable. To achieve this, the research team implemented the following approaches:

- Verifying the analysis results with participants to ensure credibility;
- Maintaining continuous involvement of the first and corresponding authors in the projects, alongside expert evaluations to validate the findings;
- Involving authors with diverse professional and academic backgrounds to ensure reliability in data analysis;
- Integrating quotes from a broad range of participants throughout the manuscript to ensure authenticity;
- Selecting participants with varied clinical experiences and specializations to support transferability.

An interview guide was specifically developed for this study, considering the unique context and characteristics of the participants. This guide, which was designed based on Kingdon's Multiple Streams Framework, includes questions that cover the problem, policy, and politics streams related to HTA in Iran. The interview guide has been included as a supplementary file 1 and can be accessed for further reference.

Results

The study involved 12 male and 4 female participants, with an average age of 41.56 ± 6.08 years and an average work experience of 14.37 ± 3.73 years. Of the 16 interviews conducted, 5 were held online and 11 in person. Participants represented diverse professional categories, including insurance managers, policymakers, researchers, physicians, pharmacists, and hospital managers. This included individuals from both public/government ($n = 12$) and private ($n = 4$) sectors, as shown in Table 1.

The findings from the interviews highlighted several key elements across Kingdon's Multiple Streams Framework, demonstrating the current state of HTA development in Iran.

Problem stream

Participants emphasized the rising costs of healthcare, particularly concerning the acquisition of imported medical technologies, as a significant concern. Indicators such as the lack of improvement in health outcomes despite high spending on technologies were consistently raised.

The rising cost of healthcare, particularly from imported technologies, is becoming unsustainable

Table 1 Demographic characteristics of participants (policy maker: refers to individuals involved in high-level decision-making within governmental or public health organizations, such as directors, senior managers, and policymakers at the MoHME. Bachelor's degree in HTA: refers to individuals with formal education in health technology assessment, specifically those with a focus on methodologies for evaluating healthcare interventions, technologies, and policies)

ID	Sex	Age	Work Experience	Specialty	Type of activity	Interview Format
1	Male	36	10	Insurance manager	Public / Government	In-person
2	Male	45	16	Researcher	Private	In-person
3	Female	37	13	Physician	Public / Government	In-person
4	Male	35	11	Assistant Professor	Public / Government	In-person
5	Male	53	23	Policy maker	Public / Government	Virtual
6	Male	42	10	Physician	Private	In-person
7	Male	49	19	Associate Professor	Public / Government	In-person
8	Female	41	16	Pharmacist	Public / Government	In-person
9	Male	38	14	Hospital manager	Private	Virtual
10	Male	40	15	Associate Professor	Public / Government	Virtual
11	Female	39	11	Researcher	Public / Government	Virtual
12	Male	49	18	Policy maker	Public / Government	In-person
13	Male	45	12	Associate Professor	Public / Government	Virtual
14	Male	37	13	Researcher	Public / Government	In-person
15	Female	48	18	Assistant Professor	Public / Government	In-person
16	Male	31	11	Bachelor's degree in HTA	Private	In-person

for Iran. We must assess if these costly technologies are actually improving health outcomes. Without a structured approach like HTA, we're at risk of making costly mistakes. (P1, P6, P11, P13).

This quotation was drawn from multiple participants, as denoted by the referenced IDs. Similarly, the need for a systematic evaluation of technologies was underscored, with HTA identified as a potential solution to avoid unnecessary expenses and ensure better patient outcomes.

We spend a lot on technologies, but we don't always see a corresponding improvement in patient care. Implementing HTA would help ensure that our investments lead to better outcomes. (P3, P5, P9, P15).

Focusing events such as economic sanctions and the COVID-19 pandemic further exposed the vulnerability of Iran's healthcare system. Several participants pointed to these events as wake-up calls for adopting HTA.

The shortages during the pandemic opened our eyes. We realized that without a system like HTA, our healthcare is vulnerable to crises. (P2, P8, P12, P16).

While this quote represents a single participant's response, others expressed similar sentiments. Feedback from healthcare institutions highlighted the inefficiency of some expensive technologies, with many not delivering the expected benefits. There was a consensus among participants that HTA would address these issues by

preventing waste and ensuring investments are directed towards technologies with proven value.

Feedback from hospitals reveals that many expensive technologies are either underutilized or don't deliver the promised benefits. (P4, P10, P14, P16).

Policy stream

Within the policy stream, participants recognized the academic and theoretical discussions surrounding HTA but expressed concern over the lack of concrete policy action. HTA has been a topic of discussion for years, but tangible steps toward its implementation have yet to be realized.

HTA has been discussed in academic and policymaking circles for a while, but it hasn't moved beyond conversation. (P2, P7, P12, P15).

Participants also acknowledged the technical feasibility of implementing HTA, given the existing infrastructure and expertise within Iran's universities and research centers. However, integrating HTA into the Ministry of Health's decision-making process was identified as a challenge that requires political backing.

We have the infrastructure and expertise needed to implement HTA. The next step is getting the political support necessary to make HTA a standard practice. (P3, P6, P13, P11).

Differences emerged between public and private sector participants regarding policy challenges. Public sector

participants emphasized the need for political will and resources, while private sector participants raised concerns about market disruption and competition.

Politics stream

The political climate in Iran appears increasingly favorable for adopting HTA, with growing interest in healthcare efficiency and transparency. Several participants mentioned that HTA aligns with political goals of improving resource allocation in healthcare, potentially enhancing government accountability.

There's growing political interest in making healthcare spending more efficient, and HTA fits well with these goals. (P3, P8, P10, P16).

Leadership changes in the Ministry of Health were also seen as a potential opportunity to push HTA forward. New leaders have shown openness to HTA, but participants emphasized the need for sustained advocacy to turn this interest into concrete action.

Recent leadership changes have created momentum for HTA, but maintaining this momentum requires ongoing advocacy from key players within the health sector. (P1, P5, P11, P13)

Policy window

Participants in crises such as healthcare shortages and the Covid-19 pandemic identified the implementation of the HTP in 2014 as a key event that could create opportunities for HTA. These crises have highlighted the vulnerabilities in the healthcare system and underscored the need for a structured approach to the evaluation and prioritization of health technologies.

Another crisis like the COVID-19 pandemic might force policymakers to recognize the importance of HTA. (P4, P10, P12, P14).

Additionally, changes in government leadership and public pressure for greater transparency in healthcare spending were seen as factors that could further open the policy window for HTA's adoption.

Since 2014, changes within the Ministry of Health, the inauguration of a new government, and the introduction of health reforms have rekindled interest in healthcare reform. This situation presents an opportunity for HTA to gain traction, but it will require sustained effort to realize its potential. (P8, P11, P14, P16).

Policy entrepreneurs

The role of policy entrepreneurs was emphasized as critical to advancing HTA in Iran. Several participants identified key individuals within the Ministry of Health and academic institutions who are advocating for HTA, though they require more visibility and support.

HTA won't become a national policy without the work of dedicated policy entrepreneurs. We already have key individuals championing HTA behind the scenes, but they need more visibility and support to succeed. (P6, P7, P12, P16).

There are advocates for HTA within the Ministry of Health who are working hard to push the policy forward. With more backing from policymakers and the public, these entrepreneurs could help make HTA a reality. (P3, P7, P13, P15).

Discussion

The findings of this study shed light on the challenges and opportunities surrounding the development of HTA in Iran, using Kingdon's Multiple Streams Framework to analyze the issue. Based on the analysis of the participant quotes and the concepts of Kingdon's Multiple Streams Framework, the development of HTA in Iran appears to be on the agenda, but not yet fully implemented or prioritized at the necessary levels. The findings demonstrate that Iran, like many other countries, faces significant challenges in fully developing HTA, but also has key opportunities to leverage for progress.

Problem stream

The rising costs of healthcare, particularly concerning imported medical technologies, have become a significant issue in Iran, mirroring global concerns about the efficiency of healthcare resource allocation. As highlighted by the participants in our study, these financial pressures are amplified in countries with resource constraints, where the need to optimize healthcare spending is critical. For instance, countries like Brazil, South Africa, and China have faced similar challenges, leading to the recognition of HTA as a vital tool for addressing inefficiencies and ensuring cost-effectiveness in healthcare [26, 27].

In **South Africa**, the implementation of HTA has helped tackle disparities in access to essential medical technologies, especially in the context of selecting medications for the National Essential Medicines List. The institutionalization of HTA in South Africa has been a strategic response to resource constraints, facilitating the cost-effective selection of medicines [27]. While this approach has yielded positive results, our study found that Iran faces more significant structural barriers, primarily due to economic sanctions and political dynamics.

Unlike South Africa, which has successfully integrated HTA into its policy frameworks, Iran's progress has been hindered by these unique contextual challenges [28].

China, similarly, has recognized the importance of HTA as a response to rising healthcare costs and an aging population. In contrast to Iran, China has successfully used HTA to inform national policies such as the National Reimbursement Drug List (NRDL), which has been central to making evidence-based decisions on which technologies to include in their health insurance system [29]. While both countries share common challenges, China's more centralized, top-down approach to HTA implementation contrasts sharply with Iran's fragmented healthcare system, providing valuable insights into the role of political landscapes in shaping HTA effectiveness [30].

The **Covid-19 pandemic** has further highlighted the urgency of integrating HTA into healthcare systems. In countries like the UK and Germany, HTA played a central role in managing the crisis and ensuring cost-effective responses to the pandemic [31]. However, in Iran, the pandemic has acted more as a catalyst for discussion about HTA rather than as a prompt for immediate policy reform. This suggests that while there is an increasing recognition of HTA's potential, its adoption in Iran remains slow, hindered by structural and political challenges.

Policy stream

While HTA has been a topic of academic discussion in Iran for several years, it has yet to be integrated into formal health policy. The gap between theoretical discussions and policy action on HTA, as identified by Iranian participants, is not unique to Iran. This gap between theoretical discourse and actual policy action is a common challenge in many countries, where the transition from academic knowledge to policy implementation is slow. This gap was especially evident in the case of South Africa, where although HTA was discussed extensively, the implementation of policy frameworks was delayed due to political resistance [28].

The technical feasibility of implementing HTA in Iran, given the existing infrastructure in universities and research centers, is promising. However, the findings underscore the need for political will to overcome the resistance from private sector actors, particularly medical equipment suppliers, who may view HTA as a threat to their business interests. This dynamic illustrates a broader tension between public health objectives and private sector interests, a challenge well-documented in the health policy literature. However, unlike in Turkey and India, where bureaucratic resistance has been identified as a significant barrier, our findings suggest that in Iran, political and sectoral resistance are the primary factors preventing HTA from moving into policy [32, 33].

Countries like India and Turkey have also struggled with moving HTA from academic discussions to formal policy adoption [33, 34]. In India, despite the existence of academic research on HTA, the institutionalization of HTA into the health ministry's decision-making processes has faced delays due to bureaucratic resistance and lack of coordination between stakeholders [33]. Similarly, Turkey's HTA development has been slow, with political challenges and private-sector opposition hampering progress [34]. However, other countries have managed to overcome these barriers. For instance, Thailand's Health Intervention and Technology Assessment Program (HITAP) offers a model where HTA was successfully integrated into national policy by securing strong political backing and aligning the process with national health goals [35]. Iran could learn from Thailand's success in securing political buy-in, particularly in light of recent government reforms that align more closely with healthcare efficiency. The experience of Thailand demonstrates the importance of political will and strategic advocacy, which are crucial factors also emphasized by participants in Iran.

Politics stream

The political environment in Iran appears increasingly conducive to the adoption of HTA, with a growing emphasis on healthcare efficiency and transparency. As highlighted by participants, the increasing political interest in efficiency and accountability in healthcare could create a supportive environment for HTA adoption shortly [36].

The alignment of HTA with broader political goals of improving resource allocation and government accountability presents a significant opportunity for its development [37]. However, the findings also highlight the need for sustained advocacy to maintain momentum, particularly in light of recent leadership changes in the Ministry of Health.

A comparison with countries like Chile and Mexico is useful here. In these nations, political shifts have created both challenges and opportunities for HTA adoption [3]. In Chile, HTA was integrated into broader healthcare reforms aimed at improving resource allocation, and in Mexico, similar reforms have recently started to bear fruit [38].

In Indonesia, the establishment of the Indonesian Health Technology Assessment Committee (InaHTAC) in 2014 was a response to the need for greater transparency and accountability in healthcare spending [39]. Iran's context, marked by political shifts, highlights the importance of advocacy in ensuring HTA's place on the political agenda.

Policy window and entrepreneurs

The identification of the Covid-19 pandemic and healthcare shortages as potential focusing events presents a key opportunity for advancing HTA in Iran. As the findings suggest, these crises have exposed vulnerabilities in the healthcare system, making the adoption of evidence-based decision-making frameworks more pressing. Our study found that while the pandemic presented opportunities for advancing HTA, it also emphasized the need for specific policy entrepreneurs who can push the agenda forward [40].

In the UK, the pandemic accelerated the role of HTA in evaluating new treatments and vaccines, reinforcing the importance of evidence-based decision-making [41]. In Germany, the Institute for Quality and Efficiency in Health Care (IQWiG) played a central role in assessing new medical technologies during the pandemic, demonstrating the value of HTA in crises [42].

The role of policy entrepreneurs, as highlighted in this study, is critical to pushing HTA forward. These individuals, whether in the Ministry of Health or academic institutions, are well-positioned to champion HTA, but they require more visibility and institutional support. This is especially evident in the case of Taiwan, where HTA faced initial resistance but was gradually integrated into the National Health Insurance system due to strategic efforts by policy entrepreneurs [43].

This aligns with Kingdon's theory, which emphasizes the importance of policy entrepreneurs in coupling the streams and seizing the policy window when it arises. The active role of these entrepreneurs in shaping the HTA agenda is essential for advancing its implementation in Iran. This finding aligns with other countries' experiences, such as Australia, where policy entrepreneurs played a significant role in pushing for the establishment of the Australian Medical Services Advisory Committee (MSAC), which now oversees HTA activities [44].

Limitations

While this study provides valuable insights, its limitations must be acknowledged. The sample size, while sufficient for qualitative analysis, is relatively small and may not fully capture the diversity of perspectives among all relevant stakeholders in Iran's healthcare system. The small sample size could limit the generalizability of the findings to the broader population of healthcare professionals and policymakers in Iran. Additionally, potential biases in participant selection could affect the representation of certain stakeholder groups, particularly those with less visibility or influence in the decision-making process. For instance, the inclusion of primarily academic or governmental stakeholders may not adequately represent the perspectives of private sector actors or marginalized communities.

Furthermore, while Kingdon's Multiple Streams Framework provides a useful lens for understanding policy development, future research could explore other theoretical models to provide a more comprehensive analysis. Additionally, the focus on a single country case study limits the ability to compare findings across different healthcare systems or policy contexts. Further research is also needed to examine the specific steps required to integrate HTA into Iran's healthcare system and the potential challenges that may arise during its implementation.

Implications of developing HTA in Iran

Developing an HTA process in Iran carries significant implications for the population, the healthcare system, and the policy landscape. These implications can play a pivotal role in advancing the effectiveness, equity, and sustainability of healthcare delivery in the country.

Impact on population

The development of HTA in Iran can ensure that the population benefits from evidence-based, cost-effective healthcare interventions. By prioritizing the adoption of technologies that provide the most benefit in terms of health outcomes relative to costs, HTA can enhance access to essential treatments and services for all segments of the population. This will not only improve the quality of care but also address existing health disparities by making healthcare more equitable, especially for marginalized or underserved groups.

Impact on healthcare system

Integrating HTA into Iran's healthcare system will help optimize resource allocation, reduce inefficiencies, and improve the overall performance of the system. As healthcare costs continue to rise, HTA will enable policymakers to make informed decisions about which health technologies and interventions should be funded, thereby avoiding unnecessary expenditures on ineffective or low-priority treatments. This can result in better utilization of available resources, ensuring that Iran's healthcare system remains both financially sustainable and capable of providing high-quality care.

Impact on policy

HTA has the potential to transform health policy decision-making in Iran by promoting evidence-based policymaking. It can provide policymakers with the necessary data to make informed choices on health technology adoption, reimbursement policies, and the design of national healthcare programs. In the long term, this can lead to more transparent and accountable decision-making processes, increasing public trust in the healthcare system. Furthermore, the development of HTA could contribute to Iran's efforts to integrate with global health

standards, improving its positioning in international health forums.

Developing a formal HTA process in Iran would not only enhance the efficiency and effectiveness of healthcare delivery but also align the country's health policies with global best practices, ensuring that the healthcare system can meet the evolving needs of its population.

To synthesize the key recommendations derived from our analysis, we have developed a one-page diagram, presented in Supplementary 2, that outlines actionable strategies for advancing HTA in Iran. This diagram integrates the study's recommendations with examples of best practices from established HTA agencies worldwide, such as the National Institute for Health and Care Excellence (NICE) in the United Kingdom, the Institute for Quality and Efficiency in Health Care (IQWiG) in Germany, and the Canadian Agency for Drugs and Technologies in Health (CADTH) in Canada, the Medical Services Advisory Committee (MSAC) in Australia and the Tandvårds-Läkemedelförmånsverket (TLV) in Sweden. These global examples highlight successful approaches to HTA implementation, providing inspiration and practical guidance for the Iranian context. The visual representation aims to clarify the recommendations and their implications for policymakers, healthcare professionals, and researchers, emphasizing their potential to improve evidence-based decision-making, resource allocation, and health outcomes in Iran.

Conclusion

This study demonstrates that HTA is recognized as an essential tool for improving healthcare efficiency and equity in Iran. However, significant challenges remain in moving HTA from academic discussion to formal policy action. The political climate appears increasingly favorable, and the ongoing health crises may provide a policy window for HTA's adoption. The role of policy entrepreneurs will be critical in navigating these complex dynamics and ensuring that HTA is prioritized on the national agenda. By addressing these challenges, Iran has the potential to develop a robust HTA program that can contribute to a more efficient, equitable, and sustainable healthcare system. By leveraging political interest, policy entrepreneurs, and focusing events like the COVID-19 pandemic, HTA has the potential to become an integral part of Iran's healthcare system. The experiences of other countries underscore the importance of political will, stakeholder engagement, and strategic advocacy in advancing HTA.

Abbreviations

HTA	Health technology assessment
UHC	Universal health coverage
COREQ	Consolidated criteria for reporting qualitative research

Supplementary Information

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Supplementary Material 1

Supplementary Material 2

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Author contributions

MaB, MY, SA, and AB contributed to the development of the idea for this article. MeB, AB, SS, SJE, MaB and SJE partook in the acquisition and analysis of data. All co-authors joined them in critically interpreting and discussing the data. MaB, SS, SJE, and MM wrote sub-sections of this article and provided input into further sub-sections of the article, along with MaB, MeB, AB, SA, MY and SS. All authors have critically revised content, have approved the submitted version of this article, and are accountable for the accuracy or integrity of any part of the work.

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Data availability

Data is provided within the manuscript or supplementary information files.

Declarations

Ethics approval and consent to participate

The study was approved by the ethical committee at Lorestan University of Medical Sciences (IR.LUMS.REC.1402.310). All the respondents were explained about the study and asked to sign the informed consent before confirming their participation. Written informed consent was obtained from each study participant before initiating each key informant interview. Verbal informed consent was obtained from each participant before initiating the study. The study procedures and methods were conducted in accordance with the ethical principles and guidance in the World Medical Association Declaration of Helsinki.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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