

Emerging horizons and strategic priorities in Iranian health policy research

Emerging horizons in Iranian health policy research

Abstract

Introduction : This study analyzed the health policy research domain in Iran from 1987 to 2025, examining publication trends within the Web of Science (WoS) database and identifying core sub-domains and conceptual trajectories.

Methods : Using co-word and network analysis techniques, 4,229 WoS-indexed documents were evaluated. Cluster analysis and strategic diagrams were applied to map the field's conceptual structure, delineate thematic sub-domains, and examine their interrelationships.

Results : The findings revealed nine distinct clusters: 1. Health System Governance, Policymaking, and Management; 2. Qualitative Research in Nursing and Hospital Care Services; 3. Mental Health, Quality of Life, and Vulnerable Populations; 4. Epidemiology of Noncommunicable Diseases and Health Inequities; 5. Public Health, Environmental Health, and Smart Technologies; 6. Epidemiology, Mortality, and Global Burden of Disease; 7. COVID-19 Pandemic and Infectious Diseases; 8. Reproductive Health, Digital Health, and Social Challenges; and 9. Knowledge, Attitude, and Practice regarding Health Behaviors.

Conclusion : The four-decade trajectory of Iranian health policy research demonstrates notable structural expansion, quantitative growth, and thematic diversification, with publication output surging dramatically post-2020. Conceptually, the discipline is anchored in health system governance and disease burden assessment, developing in parallel with emerging health crises, particularly COVID-19. This thematic expansion coincided with the transition of health policy into an interdisciplinary, decision-oriented, and evidence-based discipline. Furthermore, emerging domains such as smart technologies (including Artificial Intelligence and GIS), digital health, environmental determinants, and mental health represent prospective areas that warrant further investigation as potential future research directions. Ultimately, mapping this knowledge structure provides an informative roadmap for decision-makers, academic institutions, and research policymakers to prioritize strategic agendas and optimize resource allocation.

Keywords: Health Policy, Quality of Life, Public Health, Digital Health, Knowledge Discovery.

[1] Evolution and diffusion of information literacy ... [2] Global Research on Financial Literacy ... [3] A scientometric study of digital literacy ... [4] Identifying Emerging Areas and Map Scientific ... [5] An Analysis of Literacy Research in ... [6] Discovering Current Trends and Identifying ... [7] Discovering Current Trends and ... [8] Mapping the Research on Health ... [9] A bibliometric analysis of health diplomacy ... [10] Co-production in health policy ... [11] Analyzing the Trends and Impact of Health Policy ... [12] Trends and mapping of health policy ... [13] Mapping the global landscape ... [14] Developments in the field of health policy ... [15] Artificial Intelligence and Healthcare Policy ... [16] From Algorithm to Policy ... [17] Understanding Aging Policies in China ... [18] Sources of Information on Scientific Subjects ... [19] How to normalize cooccurrence data? ... [20] Software survey: VOSviewer, a computer program for bibliometric mapping ... [21] Co-word analysis as a tool for describing the network ... [22] Analysis on current research of supernetwork ... [23] Games research today: Analyzing the academic landscape ... [24] Intellectual structure of knowledge of imetrics

Introduction

A review of the literature demonstrates that co-word analysis and network analysis have been utilized as effective tools across various fields of science, including information literacy^[1], financial literacy^[2], digital literacy^[3], Throbbing Headaches^[4], general concepts of literacy and decision-making^[5, 6], and neuroscience^[7] to map knowledge structures. Nevertheless, applying this method in health policy has helped uncover specialized patterns and thematic trends at national and international levels. Some of these studies have focused on evaluating key topics in specific domains or subfields; for instance, research on health diplomacy, artificial intelligence integration, and co-production in health policy.

Health policy and services research is a dynamic and continuously evolving scientific domain that plays a pivotal role in informing prevention and control efforts for a variety of health conditions^[8]. This research area is inherently interdisciplinary, having exhibited interdisciplinary characteristics closely related to factors such as politics, economics, environment, and public goods. Consequently, it encompasses a broad spectrum of overlapping topics, ranging from health diplomacy^[9] to co-production in health policy and management^[10].

In this context, applying scientometric analyses to scientific documents published in authoritative citation databases enables the evaluation of dynamic trends, describing the visibility and impact of scientific production within this domain^[11]. By offering a systematic mapping of health policy research directions and gaps, such analyses establish a foundational basis for a strategic research agenda and evidence-based decision-making^[12].

Nevertheless, mapping the global landscape of health policy research reveals geographical disparities and significant imbalances in knowledge production; developed nations dominate publications in this field, establishing a persistent core-periphery structure^[13]. Although the volume of published health policy analysis (HPA), as well as its scale, scope, and analytic sophistication, has grown significantly in low- and middle-income countries (LMICs), the dominance of HIC authors persists and structural imbalances in knowledge production remain^[14]. Therefore, analyzing the status of national research and identifying existing knowledge gaps is essential for benchmarking experiences and formulating policies adaptable to local contexts^[8].

Scientometric and bibliometric analyses at international and regional levels demonstrate that scientific output in health policy experienced a massive surge, particularly following the post-2020 period alongside the COVID-19 pandemic. Using scientometric approaches, Gonzalez-Argote & López Sánchez demonstrated the high dynamics and quality of scientific documents in this field, finding that scientific production is voluminous and largely published in high-impact-factor journals. They identified key core keywords such as COVID-19, primary care, health care, health policies, and health insurance as primary pillars of this body of research^[11].

From a historical perspective, Yudantara conducted a comprehensive bibliometric analysis of public health policy literature, mapping the domain's evolution across three distinct phases: a risk focus (2000–2007), an access emphasis (2008–2015), and integrated health approaches (2016–2024). This evolutionary trajectory and the post-2020 publication boom reflect a paradigm shift from unidimensional frameworks toward comprehensive, systemic approaches^[14].

A similar pattern of growth and thematic diversification is evident at the national level. Asriadi & Sari, through a systematic mapping of health policy research directions and gaps in Indonesia, demonstrated a growing trend. The highest-frequency keywords in their study included health policy, health care policy, public health, decision-making, health insurance, and global health^[12]. Similarly, Zhao et al. identified research hotspots in health services and policy research, including topics such as HIV Infections, Primary Health Care, Delivery of Health Care, and Health Services Accessibility^[8].

Beyond domestic dimensions, the transnational and international dimensions of health policy have gained prominent importance. Jiangwei & Daud argued that research on health diplomacy not only deepens global health governance but also promotes information and resource sharing in public health. Their findings revealed that health diplomacy research possesses interdisciplinary, transdisciplinary, and temporal characteristics, closely intertwined with politics, economics, environment, and public goods. Core research topics included power, COVID-19, security, soft power, WHO, vaccine diplomacy, and governance^[9].

Another stream of the literature focuses on integrating emerging technologies and novel approaches in healthcare policy. Rashidian et al. demonstrated a marked increase in post-2020 publications, with rapid expansion in artificial intelligence and healthcare policy research. Key research themes included machine learning, COVID-19, health policy, risk, large language models, interpretable machine learning, neural network-assisted screening, socioeconomic perspectives, and public health applications, which were increasingly centered on predictive modeling, public health decision-making, and emerging artificial intelligence technologies.^[15] Similarly, Sabri & Alabdali provided a bibliometric analysis of AI research in health linked to implementation science and governance frameworks, identifying four major themes: regulatory compliance, ethical frameworks with limited operational measures, organizational readiness, and clinical workflow integration. Their findings indicated that thematic development has progressed from general ethical discussions to pandemic-related applications and more specific regulatory frameworks^[16].

In addition to technology, the shift toward patient-centered and community-based approaches in policymaking represents another core theme. Fusco et al. provided a comprehensive mapping of co-produced health literature, outlining an intellectual structure rooted in three major domains: public administration and management, service management, and knowledge translation literature. Whereas emerging themes were linked to social and health phenomena including the elderly and chronic diseases, the use of technologies, and the recent patient-centered approach to care (patient involvement/engagement)^[10]. Furthermore, attention to policy evolution in specific demographic segments indicates that target-group rights and health perspectives are replacing traditional paradigms^[17]. Examining institutional interactions and structural inequalities in health policy knowledge production forms another key component of the literature. Whyte et al. traced the trajectory of health policy analysis (HPA) in low- and middle-income countries (LMICs) from 2008 onward, noting substantial growth in

publication volume. They concluded that targeted efforts by researchers, funders, and institutions, improved domestic and regional funding, support for LMIC researchers, deeper theoretical engagement, and encouraging HPA in analytical ways that enable cross-contextual learning and explanation are essential to sustain the field's development and foster progressive policy change^[14].

Moreover, structural imbalances in knowledge production and hierarchical arrangements have been documented in multiple studies. On one hand, Yudiantara demonstrated that the United States and the United Kingdom dominate publications, with network visualizations revealing a persistent core-periphery structure that highlights disparities in productivity between developed and developing nations^[13]. On the other hand, Zhao et al., concluded that a distinct gap in research depth remains in China and developed regions/countries such as Europe and the United States^[8]. Furthermore, regarding emerging technologies, Sabri & Alabdali identified three research gaps in the algorithm-to-policy translation: the principles–practice gap, the regulatory–evidence gap, and the innovation–implementation gap.

To address these challenges and chart future pathways^[16], Yudiantara emphasized expanding data coverage, applying more sophisticated social impact metrics, and investigating informal knowledge transfer mechanisms to inform more equitable and effective public health policies globally^[13].

This comprehensive literature review demonstrates that bibliometric and scientometric studies play a vital role in mapping past trajectories, identifying current thematic hotspots, elucidating emerging topics, and exposing implementation gaps in health policy. However, because most existing studies focus on the global level, developed nations, or specific regional contexts, a notable gap exists regarding a comprehensive, systematic, and up-to-date mapping of Iran's scientific output in this field. Accordingly, the present study used bibliometric methodology to map the knowledge landscape of Iranian health policy research within the Web of Science (WoS) database. By examining research themes, trends, and emerging topics, this study aims to identify publication patterns, thematic hotspots, and existing scientific structures, thereby providing evidence-based guidance for researchers, policymakers, and healthcare managers to support strategic decision-making.

Instrument and Methods

This study used a bibliometric approach, co-word analysis, and network analysis to map the intellectual and conceptual architecture of Iranian health policy research. The methodological protocol was designed in accordance with standard guidelines for science mapping and bibliometric evaluations.

Data Source and Search Strategy

The data for this study were extracted on September 20, 2026, from the Web of Science Core Collection (WoSCC) database, encompassing the following citation indexes: Science Citation Index Expanded (SCI-EXPANDED); Social Sciences Citation Index (SSCI); Arts & Humanities Citation Index (A&HCI); Emerging Sources Citation Index (ESCI). The search query was formulated using Medical Subject Headings (MeSH) and the term health policy as follows: (TS=("Health Policy") OR AK=("Health Policy") OR AB=("Health Policy")) AND CU=Iran AND PY=(1987-2025) AND DT=("Article" OR "Review Article" OR "Proceedings Paper")

Inclusion and Exclusion Criteria

The inclusion criteria were: Peer-reviewed original research articles, review papers, and conference proceedings papers; Studies specifically addressing health policy, health systems, health governance, or healthcare delivery; Publications with at least one author affiliated with an Iranian institution or university (CU=Iran); Publications published between 1987 and 2025.

The exclusion criteria encompassed: Non-peer-reviewed or non-citable document types, such as editorial materials, letters to the editor, meeting abstracts, book reviews, corrections, and news items; Retracted publications; Records lacking a detailed abstract or relevant keyword in their metadata. To minimize language bias, no language restrictions were imposed during the data retrieval phase; however, the retrieved corpus was predominantly in English.

Rationale for the Time Span

The starting boundary of 1987 was determined empirically, as it marks the chronological inception of the first documented and indexed Iranian publication in the field of health policy within the Web of Science database. The terminal cutoff of 2025 encompassed the most recent publications indexed up to the date of the search execution; thus, a comprehensive four-decade evolutionary horizon (1987–2025) was covered.

Data Processing and Bibliometric Mapping

Following data retrieval, a total of 4,229 records were initially obtained. Metadata fields from the 4,229 plain text files were parsed using BibExcel software (version 2016-02-20). Core concepts were extracted using BibExcel and its natural language processing techniques. A total of 19,159 concepts were identified across these documents. Subsequently, standardization and normalization of the concepts were performed (e.g., merging singular and plural forms, standardizing spelling variations, and unifying synonymous terms such as COVID-19 and SARS-CoV-2), leaving 8,574 unique concepts after processing. A frequency threshold

of 10 was selected to preserve structural relationships among the research concepts. Although Bradford's Law of Scattering was originally formulated to describe the distribution of articles across scientific journals, its underlying core-periphery principle was adapted here as a systematic, evidence-based approach to determine the threshold cutoff for co-word analysis. Similar to journal dispersion, term frequency follows a highly skewed distribution where a small nucleus of core concepts constitutes the central intellectual architecture of the field, while a long tail of peripheral, low-frequency terms contributes semantic noise. By applying Bradford's three-zone division (the one-third rule) to cumulative keyword occurrences [18], a cutoff threshold of 10 was empirically established. This strategy captured the high-frequency core concepts shaping the discipline's knowledge structure while eliminating marginal terms that would otherwise clutter network visualizations and impede topological interpretation. Following this step and the execution of a series of processing routines in BibExcel, a symmetrical plain text matrix with dimensions of 199×199 was constructed, with values along the main diagonal set to zero.

The co-occurrence matrix was converted into a similarity matrix using the Association Strength Index. This matrix was subsequently imported into VOSviewer software (version 1.6.20), transformed into a correlation matrix, exported in Excel format, and re-imported into VOSviewer. VOSviewer calculates the association strength among the remaining concepts that met the defined threshold. The association strength between two concepts serves as a similarity measure, reflecting the actual co-occurrence of two concepts relative to their expected co-occurrence across the total sample of analyzed records [19, 20]. In this study, clustering was performed using VOSviewer's default algorithm, the Louvain algorithm based on the standard Newman-Girvan modularity metric, alongside the VOS (Visualization of Similarities) mapping algorithm.

To construct the strategic diagram, centrality and density scores of the conceptual network clusters obtained in the previous step were calculated using UCINET software (version 6.766). For this purpose, the strategic diagram framework established by Callon et al. was employed [21]. This approach provides a standard and widely accepted framework for mapping knowledge structures, defining the role of each thematic cluster across four strategic quadrants based on the two dimensions of centrality and density. This framework enables researchers to assess not only the current state of research themes but also their prospective evolutionary trajectories.

Findings

Annual Publication Trends

The temporal distribution of Iranian health policy literature was evaluated over the 1987–2025 period. As illustrated in Figure 1, the trajectory of indexed scientific publications demonstrates a pronounced, multi-phase upward growth pattern.

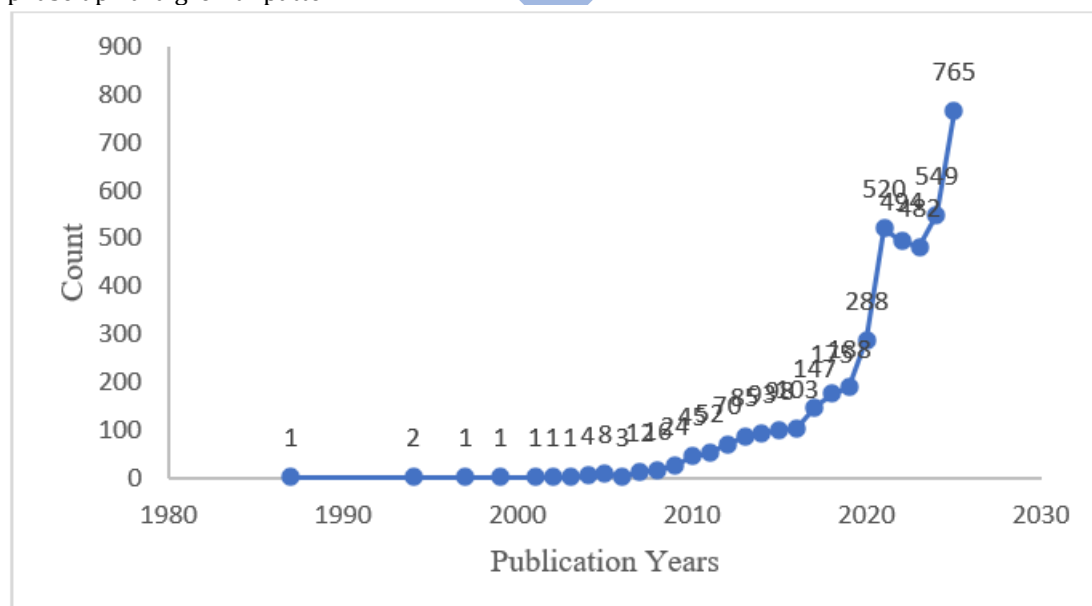


Figure 1: Publication trend of health policy records in the (WoS) database

Figure 1 illustrates the temporal trajectory of scientific output in health policy from 1987 to 2025 in the Web of Science (WoS) database, exhibiting an overall upward trajectory. The publication trend can be categorized into three distinct phases: during the first phase (1987 to 2006), publication volume was very limited, representing the initial formative stages of this research domain. Starting in 2007, publication

output entered a phase of steady and moderate growth, increasing from 12 documents in 2007 to 188 documents in 2019. However, the most significant shift occurred after 2020; publication volume surged dramatically from 288 documents in 2020 to 520 documents in 2021. Despite a minor fluctuation in 2022 and 2023, the upward trend resumed, reaching a peak of 765 fully indexed published documents for the year 2025. It is noteworthy that the 2025 dataset fully captures all final-assigned and early-access records cataloged by the Web of Science under the 2025 publication volume up to the data retrieval cutoff. This notable expansion temporally coincided with the global onset of the COVID-19 pandemic and an intensified national focus on evidence-based policymaking and decision-making, reflecting expanding scientific output, thematic broadening, and heightened international engagement within this field.

Frequency distribution of concepts in health policy on web of science

To identify the primary thematic focal points within the field, the frequency distribution of core concepts was extracted. Table 1 outlines the top 20 most frequent concepts identified through the co-word analysis.

Table 1: Frequency distribution of the top 20 core concepts in Iranian health policy research (1987–2025)

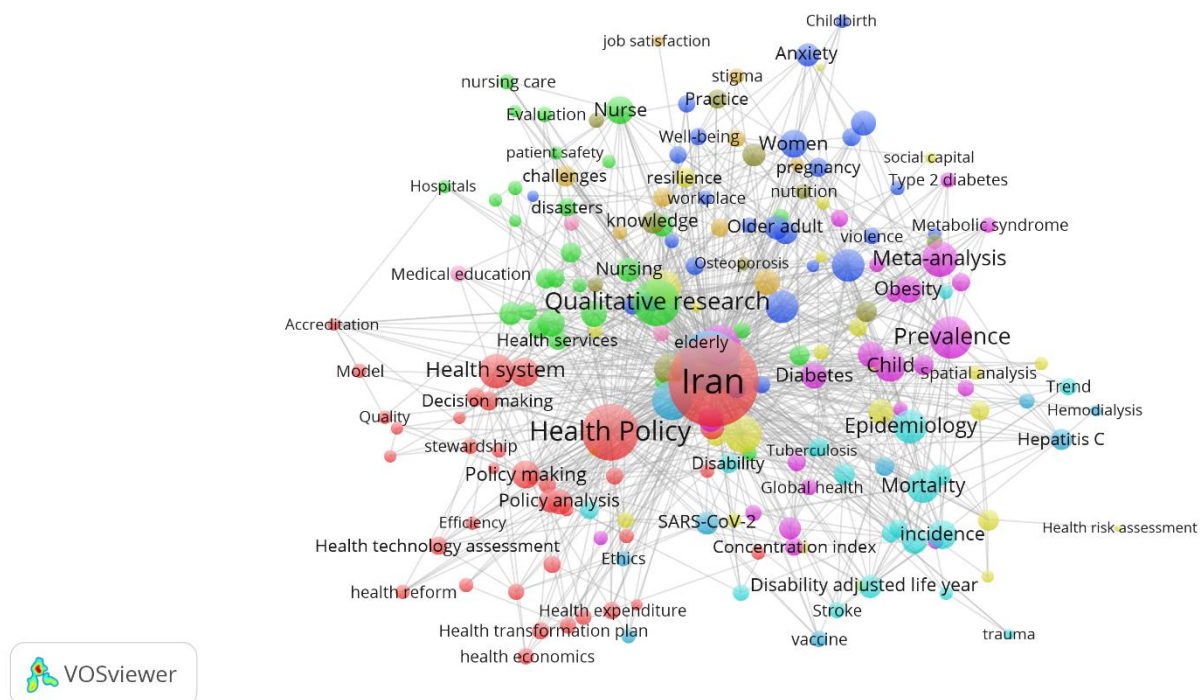
No.	Concept	Frequency	No.	Concept	Frequency
1	Iran	945	11	Pandemic	79
2	COVID 19	369	12	Epidemiology	77
3	Health Policy	260	13	Mental health	74
4	Qualitative research	225	14	Child	74
5	Systematic review	122	15	Adolescent	71
6	Prevalence	118	16	Mortality	68
7	Public health	113	17	Primary Healthcare	67
8	Health system	97	18	Nurse	65
9	Health	87	19	Quality of life	62
10	Meta-analysis	83	20	Policy	62

As presented in Table 1, the frequency distribution and ranking of key concepts in health policy research absolute occurrence frequencies, providing a comprehensive overview of thematic and methodological directions in this field. The findings show that the keyword Iran ranks first with a frequency of 945, reflecting the geographical focus of the analyzed dataset or the prominent contribution of Iranian researchers in the Web of Science (WoS) database. From a macro-thematic perspective, concepts such as COVID 19 (369), Health Policy (260), Public health (113), Health system (97), and Pandemic (79) exhibited the highest frequencies, highlighting the close connection between health policy literature, emerging health crisis management, and health system challenges in recent years. Furthermore, the strong presence of methodological concepts such as Qualitative research, Systematic review, Prevalence, and Meta-analysis points to a heavy reliance on qualitative approaches and evidence synthesis methods to support evidence-based policy formulation. Finally, high frequencies for terms such as Mental health, Child, Adolescent, Nurse, and Quality of life indicate that operational policy priorities heavily center on vulnerable demographic groups (children and adolescents), essential health workforce cadres (nurses), mental health, and population quality of life.

Topography of knowledge: Nine conceptual clusters in health policy

To determine the number of clusters, cluster analysis in VOSviewer was conducted, as illustrated in Figure 2 and Table 2. As shown in the visualization, concepts in Health Policy research over the analyzed period partition into nine distinct clusters.

The co-word network map in Figure 2 indicates that Health Policy concepts aggregate into nine thematic clusters.



Concept Trends in Iranian health policy research based on Overlay Visualization. [Figure 3](#) presents the overlay visualization map showing concept evolution over time. Overlay visualization is used to illustrate temporal developments in the field.

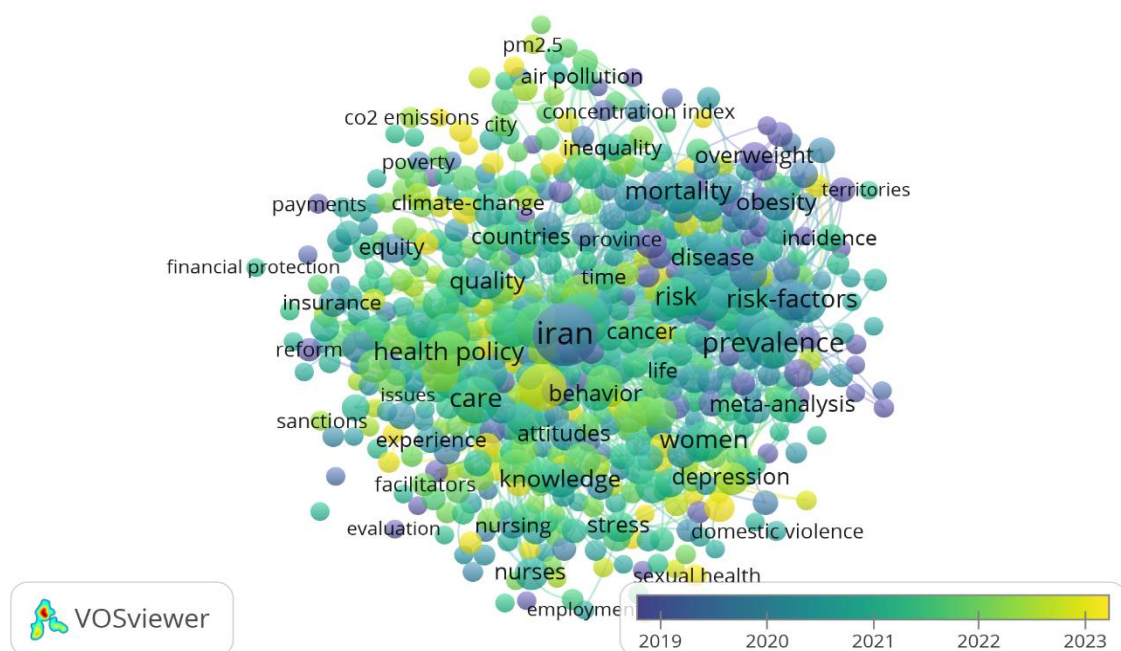


Figure 3: Co-word map of health policy literature based on overlay visualization

As shown in Figure 3, nodes shifting toward yellow represent recent research trends (COVID 19, anxiety, global burden of disease, climate change, sexual health, health literacy, artificial intelligence, etc.). Conversely, concepts prominent in earlier decades appear in darker shades.

Table 2 lists the cluster names and key sub-themes along with concept weights.

Table 2: Cluster names and key sub-themes in Iranian health policy research

No.	Cluster Name	Key Concepts and Concept Weights
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1	Health Governance, Policy-Making, and Management	Iran (2974), Health Policy (1026), Health system (330), Primary Healthcare (214), Policy making (194), Policy analysis (160), Prevention (144), Universal health coverage (134), Decision making (82), Governance (80), Health technology assessment (74), Utilization (70), Health expenditure (68), Health equity (66), Health transformation plan (66), Health insurance (64), Equity (62), Resource allocation (60), Health economics (58), Interrupted time series analysis (56), Stewardship (54), Cost (48), Health reform (48), Health financing (46), Stakeholder analysis (46), Family physician (44), Economic burden (42), Model (42), Economic evaluation (36), Efficiency (36), Quality (36), Access (34), Accreditation (34), Insurance (34), Knowledge translation (34), Evidence-based practice (32), Development (26), Willingness to pay (26).
2	Qualitative Research in Nursing and Hospital Care Services	Qualitative research (680), Nurse (202), Healthcare (192), Barriers (168), Nursing (144), Hospital (136), Cancer (122), Education (120), Management (102), Breast cancer (100), Scoping review (98), Research (94), Health services (88), Disasters (78), Facilitators (78), Palliative care (78), Eastern Mediterranean Region (62), Evaluation (50), Nursing care (50), Students (50), Review (48), Cervical cancer (42), Qualitative (42), Grounded theory (40), Participation (40), Patient safety (38), Screening (38), Hospitals (36), Safety (32), Implementation (30).
3	Mental Health, Quality of Life, and Vulnerable Populations	Mental health (290), Adolescent (284), Women (198), Depression (162), Older adult (142), Quality of life (132), Anxiety (130), Health promotion (100), Elderly (92), Oral health (90), Pregnancy (88), Stress (80), Women's health (76), Health Literacy (72), Well-being (70), Family (68), Aging (66), Social determinants of health (66), Violence (58), Social support (54), Health education (48), Food insecurity (46), Workplace (46), Childbirth (38), Pregnant women (36), Lifestyle (34), Health behavior (32), Fertility (26).
4	Epidemiology of Noncommunicable Diseases and Health Inequities	Prevalence (512), Systematic review (488), Meta-analysis (352), Child (276), Obesity (192), Risk factors (168), Diabetes (164), Noncommunicable disease (162), Inequality (122), Hypertension (94), Overweight (80), Socioeconomic factors (76), Concentration index (72), Pediatrics (68), Global health (62), Life expectancy (62), Developing countries (60), Medical education (58), Socioeconomic status (58), Blood pressure (54), Decomposition (54), Health personnel (54), Metabolic syndrome (52), Type 2 diabetes (52), Healthcare system (48), Health-related quality of life (46), Dental Caries (42).
5	Public Health, Environmental Health, and Smart Technologies	Public health (390), Health (304), Cardiovascular disease (156), Air pollution (104), Resilience (92), Tehran (84), Physical activity (78), Climate change (72), Artificial intelligence (60), Food security (52), Machine learning (44), Spatial analysis (44), Environment (40), Gis (40), Built environment (38), Deep learning (36), Sustainable development (36), Theory of planned behavior (36), particulate matter (34), Social capital (28), Urban planning (28), Air quality (26), Sustainability (24), Sustainable development goals (24), Risk assessment (22), Health belief model (12), Health risk assessment (8).
6	Epidemiology, Mortality, and Global Burden of Disease	Epidemiology (302), Mortality (286), Incidence (220), Global burden of disease (156), Disability adjusted life year (DALY) (130), Middle East (108), Burden (102), Addiction (86), Disability (86), Burden of disease (80), Rehabilitation (80), Treatment (80), Trend (64), Stroke (62), Harm reduction (58), Suicide (48), Injury (36), Tuberculosis (34), Trauma (22).
7	COVID-19 Pandemic and Infectious Diseases	Covid 19 (1198), Pandemic (432), Sars-cov-2 (124), Hepatitis C (106), Vaccination (82), Vaccine (56), Ethics (54), Hepatitis B (54), System dynamics (42), Hemodialysis (28).

8	Reproductive Health, Digital Health, and Social Challenges	HIV (172), Challenges (104), Reproductive health (82), Content analysis (78), Sexual health (66), Stigma (52), Telemedicine (42), Abortion (38), Digital health (32), Job satisfaction (22).
9	Knowledge, Attitude, and Practice regarding Health Behaviors	Policy (252), Knowledge (136), Attitude (128), Smoking (104), Practice (82), Tobacco (54), Aged (52), Nutrition (52), Physician (52), Osteoporosis (38).

The concept distributions and total link strength (TLS) metrics in table 2 reflect the relational centrality of terms within the co-occurrence network, whereas Table 1 represents raw individual occurrences. For example, while the concept Iran occurs across 945 documents, its total link strength equals 2,974, indicating dense, multi-link co-occurrences with numerous policy and health concepts. Cluster 1 (Health System Governance, Policymaking, and Management), centered on core keywords Iran (2974) and Health Policy (1026), constitutes the core domestic foundation focused on policy analysis and macro-level reform evaluation. Alongside it, Cluster 7 (COVID-19 Pandemic and Infectious Diseases), with heavily weighted terms such as Covid 19 (1198) and Pandemic (432), reflects the extensive co-occurrence network formed during the recent biological crisis. Methodological analysis shows that the research base rests on two primary pillars: qualitative research methods in clinical and hospital care (Cluster 2, with Qualitative research weighted at 680) and quantitative systematic review and epidemiological methods focused on noncommunicable diseases (Cluster 4, with Prevalence at 512 and Systematic review at 488). Finally, moderately weighted yet strategically crucial clusters, such as mental health, quality of life, and vulnerable populations (Cluster 3), Public Health, Environmental Health, and Smart Technologies (Cluster 5), and Reproductive Health, Digital Health, and Social Challenges (Cluster 8) highlight a dynamic transition from treatment-centric paradigms toward a holistic, multidisciplinary, and forward-looking research framework.

Strategic positioning of research clusters

After constructing matrices for each cluster and importing them into UCINET software, centrality and density scores were calculated, and the strategic diagram was plotted. The diagram's origin was set at the mean centrality (17.42) and mean density (1.02). The calculated density and centrality scores for the nine thematic clusters are summarized in Table 3.

Table 3: Centrality and Density parameters for the nine health policy research clusters

No.	Cluster name	Centrality	Density
1	Health System Governance, Policymaking, and Management	36.789	0.994
2	Qualitative Research in Nursing and Hospital Care Services	17	0.586
3	Mental Health, Quality of Life, and Vulnerable Populations	16.714	0.619
4	Epidemiology of Noncommunicable Diseases and Health Inequities	24.519	0.943
5	Public Health, Environmental Health, and Smart Technologies	9.778	0.376
6	Epidemiology, Mortality, and Global Burden of Disease	18	1
7	COVID-19 Pandemic and Infectious Diseases	31	3.444
8	Reproductive Health, Digital Health, and Social Challenges	6.2	0.689
9	Knowledge, Attitude, and Practice regarding Health Behaviors	14.2	1.578

Cluster 1 registered the highest centrality score (36.789), whereas Cluster 7 achieved the highest density score (3.444). The high centrality of Cluster 1 underscores its broad influence, interaction, and links with other key health policy topics, confirming its central role across the entire network. Conversely, the high density of Cluster 7 reflects strong internal structural cohesion and tight co-occurrence linkages among its constituent concepts.

A strategic diagram visually depicts internal cohesion and cross-cluster relationships. In strategic mapping, the horizontal axis typically represents centrality (the degree of cross-cluster correlation), while the vertical axis represents density (the strength of internal cohesion within a cluster)^[22]. Melcer et al. described the strategic diagram as an analytical tool to visualize thematic maturity and structural cohesion within a research field^[23].

Based on the strategic diagram in Figure 4, the strategic plot is divided into four quadrants. Clusters located in Quadrant I are highly cohesive and centrally positioned in the field, representing motor themes that drive a major portion of the network. Clusters in Quadrant II are internally cohesive but peripheral, representing specialized niche topics. Quadrant III contains emerging or declining themes characterized by low density and low centrality. Finally, Quadrant IV contains foundational, well-connected themes that have low internal density but high centrality, possessing the potential to evolve into motor themes^[23, 24].

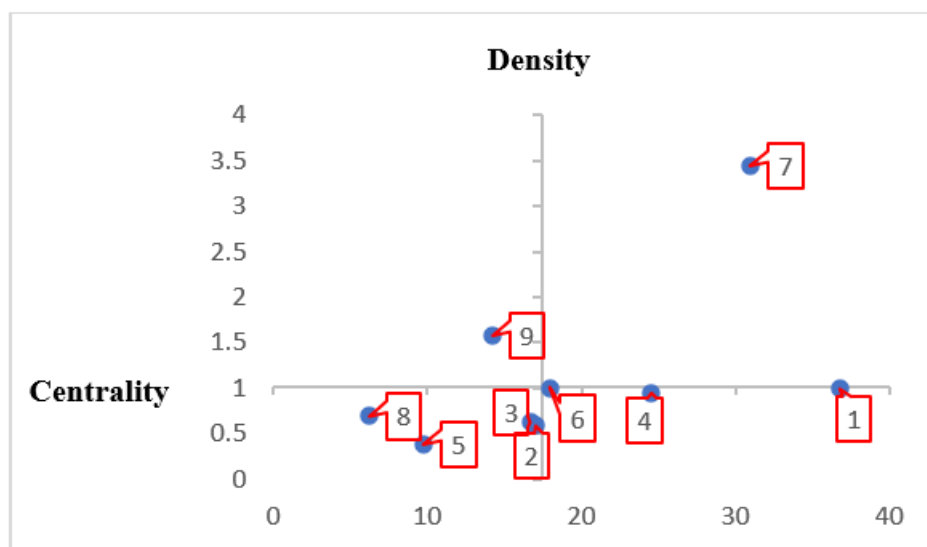


Figure 4: Strategic diagram of health policy research

Based on the strategic diagram: Quadrant I: Cluster 7 (COVID-19 Pandemic and Infectious Diseases) functions as the primary motor theme. It is structurally cohesive, holds a central position, and connects extensively across the network. Cluster 9 (Knowledge, Attitude, and Practice regarding Health Behaviors) lies in Quadrant II: representing a specialized, internally cohesive, yet relatively isolated research topic. Quadrant III: Clusters 2 (Qualitative Research in Nursing and Hospital Care Services), 3 (Mental Health, Quality of Life, and Vulnerable Populations), 5 (Public Health, Environmental Health, and Smart Technologies), and 8 (Reproductive Health, Digital Health, and Social Challenges) occupy the quadrant theoretically designated in Callon's typology as 'emerging or declining' themes due to their lower centrality and density scores within this cross-sectional dataset. Quadrant IV: contains themes that serve as foundational pillars with high potential to influence core domain developments. In this study, Clusters 1 (Health System Governance, Policymaking, and Management), 4 (Epidemiology of Noncommunicable Diseases and Health Inequities), and 6 (Epidemiology, Mortality, and Global Burden of Disease) map into this quadrant.

Discussion

The strategic diagram analysis and co-word mapping delineate the structural development, thematic distribution, and intellectual trajectory of Iranian health policy research over nearly four decades. By positioning research clusters across the two-dimensional space of centrality and density, this study contextualizes domestic thematic priorities within the broader global landscape of health policy and systems research.

Methodological findings identified Cluster 7 (COVID-19 Pandemic and Infectious Diseases) as the sole motor theme of the Iranian health policy network, distinguished by exceptional internal cohesion and high cross-network interaction. Conceptually, this demonstrates that the public health crisis functioned as an overarching thematic catalyst, reorganizing health research priorities around infection containment, vaccine ethics, and emergency preparedness. This observation aligns with international bibliometric findings by Gonzalez-Argote & López-Sánchez^[11] and Yudiantara^[13], who documented an unprecedented post-2020 surge where pandemic-related topics rapidly dominated global health policy agendas. Furthermore, the high relational bridging capacity of this cluster mirrors the findings of Jiangwei & Daud^[9], affirming that biological crises inherently transcend narrow clinical confines to reshape multi-sectoral governance and policy analysis.

Cluster 9 (Knowledge, Attitude, and Practice regarding Health Behaviors) emerged as an internally cohesive yet peripheral domain in Quadrant II. Scientometrically, its high density reflects established methodological maturity and conceptual consistency, while its below-average centrality indicates limited thematic interaction with macro-governance and structural clusters. In contrast to international trends documented by Fusco et al.^[10], where behavioral research and patient-centered approaches have increasingly merged with mainstream public administration and service design, the Iranian literature exhibits a persistent structural disconnect: behavioral and lifestyle interventions (e.g., smoking cessation, nutrition awareness) are predominantly evaluated as standalone epidemiological inquiries rather than being integrated into upstream legislative and economic policy frameworks.

Quadrant III captured four clusters characterized by lower density and centrality: Cluster 2 (Qualitative Research in Nursing and Hospital Care Services), Cluster 3 (Mental Health, Quality of Life, and Vulnerable Populations), Cluster 5 (Public Health, Environmental Health, and Smart Technologies), and Cluster 8

(Reproductive Health, Digital Health, and Social Challenges). This positioning reflects two distinct scientific phenomena. On one hand, clinical nursing and mental health literature, while abundant, remains localized around descriptive quality-of-life evaluations, exercising limited structural leverage over national resource-allocation policies. On the other hand, the presence of smart technologies (AI, machine learning, GIS), digital health, and environmental determinants (climate change, air pollution) delineates genuine emerging frontiers. These thematic hotspots mirror the temporal frontiers identified in overlay visualizations by Rashidian et al.^[15] and Sabri & Alabdali^[16]. Their current position in Quadrant III underscores what Sabri & Alabdali defined as the innovation-to-policy gap and regulatory-evidence gap^[16]: while technical explorations of AI, predictive algorithms, and spatial analytics are expanding in Iranian health research, their institutionalization into formal governance, ethical guidelines, and health technology assessment frameworks remains in its early formative stages.

The structural configuration placed Clusters 1 (Health System Governance, Policymaking, and Management), 4 (Epidemiology of Noncommunicable Diseases and Health Inequities), and 6 (Epidemiology, Mortality, and Global Burden of Disease) in Quadrant IV. Methodologically defined by high centrality but moderate density, these clusters constitute the transversal foundation of the discipline. Cluster 1 registered the highest centrality score across the entire network, affirming that governance frameworks, health financing, and universal health coverage serve as the intellectual anchors connecting diverse policy subfields. This foundational positioning resonates with the trajectory outlined by Whyte et al.^[14] regarding health policy analysis in low- and middle-income countries (LMICs), where macro-level governance reforms and health system strengthening typically form the central intellectual core. Similarly, the close integration of disease burden and noncommunicable disease (NCD) metrics reflects national health realities: as highlighted by Zhao et al.^[8] and Yudiantara^[13], LMICs undergoing rapid epidemiological transitions must continuously align policy formulation with population mortality metrics and equity assessments, which explains why quantitative disease surveillance acts as a structural bridge feeding broader policy discourse.

Conclusion

Overall, the findings from the strategic diagram and co-word analysis of Health Policy literature in the Web of Science database demonstrate significant structural expansion, thematic diversification, and growing quantitative output over the past four decades. Quantitative output trends indicate that after a period of initial latency and gradual growth, scientific production surged dramatically post-2020, peaking in 2025.

Integrating the cluster analysis and strategic diagram mapping synthesizes the conceptual landscape of Iranian health policy research into four primary dimensions: 1. COVID-19 Pandemic and Infectious Diseases (Cluster 7) served as the primary motor theme, recording the highest network density and exhibiting strong co-occurrence linkages across the literature during recent biological health crises. 2. Health System Governance, Policymaking, and Management (Cluster 1), Epidemiology of Noncommunicable Diseases and Health Inequities (Cluster 4), and Epidemiology, Mortality, and Global Burden of Disease (Cluster 6) formed the conceptual backbone, with Cluster 1 exhibiting the highest centrality score, functioning as a structural bridge to feed theoretical and policy frameworks across all domains. 3. Knowledge, Attitude, and Practice regarding Health Behaviors (Cluster 9) operated as a specialized, internally cohesive, yet peripheral niche with mature internal literature but limited cross-network integration. 4. Qualitative Research in Nursing and Hospital Care Services (Cluster 2), Mental Health, Quality of Life, and Vulnerable Populations (Cluster 3), Public Health, Environmental Health, and Smart Technologies (Cluster 5), and Reproductive Health, Digital Health, and Social Challenges (Cluster 8) emerged as frontier domains that, despite current lower density and centrality, possess significant potential to shape future research priorities.

Empirically, this bibliometric mapping demonstrates that Iranian health policy research in the Web of Science is structured around health system governance and epidemiological burden assessments, while maintaining high topical responsiveness to public health emergencies. Rather than indicating definitive endpoints, the structural positioning of these clusters reveals clear gaps and alignments across the research portfolio. These empirical findings offer an evidence-based roadmap for decision-makers, academic institutions, and research policy administrators to optimize resource allocation and prioritize future health policy research.

Research recommendations

1. Given the placement of smart technologies (AI, machine learning, GIS) and digital health in Quadrant III, future research should focus on policy frameworks for integrating AI into health systems, addressing ethical and legal challenges of digital health, and applying spatial analysis (GIS) to evaluate equitable health resource allocation.
2. Following the emergence of keywords such as Climate change and Air pollution in recent overlay trends, developing national frameworks for health system resilience against climate change and