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Establishing an Observatory on Human Resources for Health (HRH) in Iran: A Qualitative Case Study

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Abstract

Background: Many countries face critical challenges due to shortage and maldistribution of human resources for health (HRH). An HRH observatory can be used as a mechanism to monitor HRH issues and facilitate evidence-based decision-making. This study aims to identify the essential elements of an HRH observatory for Iran.

Methods: This qualitative study was conducted through semi-structured interviews with 30 key informants over two months since May 2019. Purposeful and snowball sampling methods were used. Each interview lasted a minimum of 60 min. Data analysis was performed using the content analysis approach.

Results: The essential elements for integrating HRH information were categorized into the following themes: organizational structure, partnership, prerequisites for implementing HRH observatory, data management, and evidence-informed policymaking. Our results propose a national HRH observatory for Iran consisting of steering, technical and research boards, and also stakeholders' and research networks under the governance of the ministry of health and medical education (MOHME). It is required to make a comprehensive plan in several steps and arrangements based on the country's situation. The stakeholder's network was identified based on their role in HRH development and production of information and evidence. The main aim of the HRH observatory considers monitoring trends in patterns of the HRH for evidence-based decision-making and policy development. Our results propose an evidence development network consisting of a national HRH Research Center (HRHRC) and a cooperative network formed by several medical universities.

Conclusion: We provide a comprehensive approach to establishing a national HRH observatory. We consider the HRH observatory as a cooperative initiative among key stakeholders to produce knowledge in order to improve human resource policymaking. The proposed HRH observatory model emphasizes networking and stakeholder involvement.

Keywords: Health Workforce, Human resource for health, Information system, Observatory

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Introduction

Human resources (HR) is the cornerstone of any health care system (HCS), to which around 60–70 percent of the total HCS budget is allo cated (1, 2). HR issues such as size, composition, geographical distribution, and quality performance have critical roles in improving the healthcare system's performance, efficacy, effectiveness, and equity (3).

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↑What is "already known" in this topic:
The majority of countries do not use the huge collected data for HRH planning and decision-making because of unreliable HRH data with poor linkages to other data sources.

→What this article adds:
We introduce the essential elements for an HRH observatory and provide practical recommendations for action toward HRH data integrity. We provide a comprehensive plan in areas of advocacy, stakeholder involvement, HRH observatory structure, and prerequisites to produce knowledge to improve human resource policymaking.

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Then there is an increasing need for effective human resource planning to balance human resources in the health sector with national health goals. Clearly, the existence of reliable and timely HRH information is a prerequisite for health planning (4). While HRH planning is faced with a number of challenges, for instance, a lack of consistent terminology, a lack of data, limited model planning (i.e., demand-based, supply-based, and future-based), and limited inter-country collaboration. However, the importance of HRH information is well recognized and appreciated by all countries.

In 2010, a technical meeting was held by WHO to promote a consistent and systematic approach to reinforcing human resource information systems (HRIS) for supporting policymaking and research in this area (5, 6). An overriding message derived from the meeting focused on the need to find ways to help countries to manage their health workforce information intelligently. A strong HRIS can provide specific information to support policymakers in the health system for effective HRH management.

However, many countries, especially developing ones, are faced with some obstacles in their HRISs. Based on a global review, a high percentage of countries reported their ability to generate HRH data. However, few countries used the massive collected data for HRH planning and policy making. Additionally, most countries experiencing crisis levels of HRH shortages did not report any data in the field of human resource qualifications or professional credentialing as part of their HRIS (6). Such obstacles have roots in the fragmentation of HRH information, shortage of finances, weakness in information technology infrastructures, and so on (1, 7-9). Therefore, an HRH observatory can be an effective intervention for tackling the mentioned problems (10).

An HRH observatory is defined as a collaboration network between relevant stakeholders to produce information and knowledge to implement evidence-informed policymaking (11). Therefore, HRH observatory design is based on various inputs, including the background, governance, organizational arrangement, system objectives, dominated supervision practice, available resources, and information and communication technology (ICT) infrastructure (12). In other words, the HRH observatory is established to collect, analyze, and disseminate data to conduct applied research and generate knowledge, contribute to policy development, build capacity and understand HRH issues, and advocate and facilitate dialogue between stakeholders. Therefore, components and features of the HR system in any health care system should be considered while designing an HRH observatory (10).

There has been little research to point out the HRH challenges in Iran. However, Ehsani reported that the main challenges of HRH management in Iran include lack of unified governance and comprehensive planning, maldistribution of HRH, weakness in retention and motivation of the HRH, weaknesses in formulation and implementation of laws, dual practice, unbalanced geographical distribution of physician and nonphysician staff, and inefficiency of human resources (13).

To reach an optimal balance between the demand and supply of HRH, it would be essential to ensure that the right number of people with the right skills are at the right place at the right time to deliver the right services to those in need of them (4). An HRH observatory is considered the cornerstone of HRH planning and management to achieve this aim. However, there is a profound challenge to capturing HRH information due to the lack of an integrated HRH information system in Iran. For instance, pre-service data (currently enrolled and graduating students) are fragmented in different universities (i.e., state universities, non-state universities, and other educational institutions, including the military and Baghiatellah University). Also, health care services are provided by different institutions, including governmental, private, social security, military, and charity sectors in the country. Therefore, there is essential to establish a functional and comprehensive HRH information system for the HRH observatory. This case study was undertaken from the perspective of various stakeholders, including members of medical universities, research institutions, government officials, and non-governmental organizations. We investigate the structure, actors, actions, functions, products, and also a prerequisite for implementing an HRH observatory in Iran.

Methods

This qualitative study was conducted in Iran in 2019. The data collection method was a semi-structured interview. Also, data were analyzed using qualitative content analysis (14).

Sampling

Sampling was targeted based on a set of predetermined criteria with the maximum variant approach. For instance, participants were selected based on their involvement in HRH management and health information technology fields at national and sub-national levels. All participants were selected for the interview had the following inclusion criteria: background in HRH management, health policy, or health information technology, and > 4 years of experience in the related field. Through the review process, 20 potential interviewees were identified. We also requested these individuals to introduce other experts engaged in the field, which resulted in ten interviewees joining the study. Finally, we conducted interviews with 30 key informants: four policy makers in educational, treatment and health deputies of the ministry of health and medical education (MOHME), six from human resource departments affiliated to the deputy for management development, resources and planning in the MOHME who are responsible for human resource management, five from human resource departments of medical universities, three experts of the information system in the MOHME, five professors HRH management or health government and health technology, four staff experts of the human resource and information technology and statistics departments in the MOHME and medical universities. Also, it ensured variability among different institutions including three informants, were of the private, social security, and military sectors. Out of these 30 participants, eight were physicians, sixteen of the directors were Ph.D., and six had master's or bachelor's degrees.

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Moreover, there were four females and twenty-six males among the interviewees.

Interview schedule and data collection

The interview guide was prepared based on the research objectives by reviewing the literature (1, 15-18). The interviews were semi-structured with 23 open-ended questions (Appendix 1). The interview guide included the following dimension: organizational structure, HRH data sources, key stakeholders, HRH indicators, and data management. Interview questions were submitted to participants 3 days before the start of the interview. Data collection was conducted over two months, from May to July 2019. Face to face Interviews were conducted at the participant's workplace by one of the authors (ZN). Interviews typically lasted between 60 minutes and one hour and a half. Interviews were recorded, and also interviewers took notes to ensure that rich details were captured. Sampling continued until data saturation was reached. Before beginning the interviews, four pilot interviews were conducted that led to modifying the interview guideline in terms of the sequence of questions. The actual interviews started after making the required adjustments. Meanwhile, we developed a draft list of the main stakeholders and indicators and asked interviewees to prioritize the list (Appendix 2 and 3). The participants were assured of anonymity.

Analysis

All interviews were recorded and then transcribed verbatim (word for word). Transcripts were provided to the participants for validation. The content analysis method was used to identify categories and subcategories in participants' descriptions. Coding was done using an inductive approach. Our coding process was developed in several steps. First, a team consisting of two researchers read the transcripts line by line and selected the codes separately (ZN, KS). After that, the codes were divided into categories and subcategories. Third, they met to check and discuss the codes. Meanwhile, a third researcher (MN) was consulted for a final decision in case of unsolved disagreements between ZN and KS. Next, all researchers reviewed the extracted codes to identify the concepts and relationships between themes, categories, and sub-categories. Quotes are presented in italics in the results section to present the majority opinions and conformity among the responses.

Validity and reliability

Four criteria named credibility, confirmability, transferability, and dependability were used to maintain the trustworthiness of the extracted themes (19). Credibility was boosted through prolonged engagement with interviewees, the achievement of data saturation, and the sampling method. Also, member check supported credibility. After data analysis participants were provided a complete transcript of their coded interviews. They confirmed the extracted themes. Meanwhile, maximum variant sampling (different positions, backgrounds, and work sectors) also validated the confirmability of data. In the case of reliability of study results, we asked other researchers in the field to assess the coding process. They were two experts who were experienced in qualitative research. They checked the transcripts of interviews and coded them as well. Then reliability of the coding was calculated to the number of agreed codes over the total number of codes for Inter-Rater Reliability (IRR). A score of more than 70% is considered a desired agreement. Additionally, the results were discussed with two managers and academicians in the field of HRH who did not participate in our interview but who confirmed the soundness, fitness and transferability of the results. This confirmed transferability of results.

Ethics consideration

Written informed consent was obtained from each participant before starting each interview. Ethics approval was obtained from the Ethical Review Committee of Health Human Resources Research & Studies Center (HHRRS) affiliated with the MOHME. This study was conducted under the principles of the Helsinki declaration and approved by the HHRRS Research Ethics Committee.

Results

The findings of this study were categorized into the following themes: dimension 1: HRH observatory framework; dimension 2: partnership; dimension 3: prerequisites for implementing an HRH observatory; dimension 4: data management; and dimension 5: evidence-informed policymaking. Details were reported shortly in the case of themes, categories, subcategories, and participants' quotes.

Dimension 1: HRH observatory framework

The first theme describes the observatory's organizational structure. National or regional structures were considered as possible structure options. However, 80 percent of participants preferred a national HRH observatory structure rather than the regional one. The national structure was selected for several reasons. At first, the policymaking process in Iran's health system is concentrated. Next, there is integrity in major Health Information Systems (HIS). Also, there is an unacceptable previous experience in decentralizing the educational system named territorial agenda that leads to diverse outcomes because of different regional performance or capabilities. In the next theme, a national secretariat office was proposed as the focal point of the cooperative network in the national HRH observatory. The elements of the national secretariat are suggested as steering, technical and research center, and also stakeholders' networks under the governance of the MOHME (Table 1).

"I disagree with creating a similar structure of the Ministry of Health in medical universities or territorial agenda. The performance of educational deputies in the universities has not been acceptable" (P16).

"We have similar experience in designing the country's health map 2025 by collecting information from the environmental units, which led an unbalanced planning in the country." (P20)

"Medical universities have not a central role in macropolicies, observatory requires a change in the existing structure, which is currently not possible." (P10)

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Table 1. HRH observatory framework

Dimension 1: HRH observatory framework		
Theme	Category	Sub-category
HRH observatory structure	National structure Vs. Regional structure	□ Existence of a multi-dimensional approach to HRH issues (+) □ A centralized policy-making process in the field of HRH (+) □ The necessity of using multiple data sources for HRH observatory □ Need to use the integrated information systems (most of the databases are national) (+) □ Need for a national HRH plan (+) □ Previous experience in the decentralization of the educational system (+) □ The competition between some of the universities in the territorial agenda (+) □ Shifting power from central government to sub-national (-) □ Using the existence structure titled "territorial agenda" in the educational system (-) □ Using the existing structure in the primary health care (PHC) for HRH observatory (-)
HRH observatory secretariat	Central organization level Vs regional organization level	□ National Focal point of the cooperative network in the HRH observatory (+) □ Direct responsiveness of secretariat to MOHME (+) □ Centralized policy-making process in the field of HRH (+) □ The specialist task of development and resource management deputy of the MOHME (+) □ Using the existing structure (I.e., statistics unit) in medical universities (-)

+: Refers to the items that were in favor of national structure
-: Refers to the items that were against of national structure

"HRH situation monitoring needs political power to aggregate HRH data from different organizations. From my point of view, this power in Iran there is in planning and budget organization or provincial government organizations." (P17).

Dimension 2: Partnership

Participants reported that stakeholders' involvement would improve the HRH observatory sustainability. Therefore, a mechanism should be defined to increase cooperation between key stakeholders with the HRH observatory. The themes included stakeholders, a communication mechanism, and HRH educational system (Table 2).

Stakeholders

Key stakeholders' network was proposed by the interviewees. All relevant stakeholders were identified based on their role in HRH data and information production in addition to other functions touching on HRH policy-making, management and development (Appendix 2).

"Accessing other organizations' information is largely subject to political debate. Therefore, it needs a discourse

Table 2. HRH observatory partnership

Dimension 2: Partnership		
Theme	Category	Sub-category
Stakeholders	Key stakeholders' network	□ Identify key stakeholders based on their role in HRH data production □ Identify key stakeholders based on their role in HRH policy-making, management, and developme □ Formulate a collaboration model for Inter- and extra-organizations from the MOHME □ Develop a stakeholder network to improve observatory sustainability
communication mechanism	Central organizational interaction	□ Defining communication levels in a stepwise approach for different organizations □ Design a communication mechanism and continuous collaboration with the extra-organizations fro the MOHME □ Interaction between the minister of health with the head of other organizations (i.e., the social securit the military, and charity sectors) □ Membership of key actors and their involvement in HRH observatory □ Using the e-government platform □ Developing an HRH information network □ Developing a stakeholder network □ Commitment to national documents (the universal health coverage, development plans, Iranian n tional scientific map, and so on)
	Indirect organizational interaction	□ Using existence control knobs in the MOHME (i.e., licensing and accreditation) □ Identification of the extra-institutions from the MOHME in the field of HRH management □ Design a communication mechanism and continuous collaboration with the extra-organizations fro the MOHME □ Communicate between different deputies in medical universities □ Collecting HRH data in some cases like private sector by medical universities in the form of indire organization interaction
HRH educational system	Communication mechanism of the HRH Educational System with HRH observatory	□ Design a connection between the education deputy with other deputies of the MOHME □ Design a connection between the education deputy with the national HRH observatory □ Membership head of education deputy in the steering committee affiliated with the HRH observato □ Establish an HRH planning unit in the HRH observatory □ Making decisions based on evidence instead of expert opinions □ Creation of national data sources in the field of medical education □ Formulate a national road map in the field of medical education □ Commitment to national documents (the universal health coverage, development plans, Iranian n tional scientific map, and so on)

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with a detailed description of the benefits among different stakeholders to attract their participation" (p11).

"Key Stakeholders should consider as a member of steering board in the national observatory" (P16).

A communication mechanism

Interviews indicated that observatory needs to synthesize health market data within the wide variety of health service delivery institutions affiliated with the public, private, social security, military, and charity sectors. The point is HRISs in the mentioned sectors are not integrated. Also, the centralized decision-making process in the health sector reduces the opportunity for extra-organizations from the MOHME to participate in decision-making. Then some mechanisms were proposed to aggregate HRH data from different organizations in several steps. They were first, identifying the key stakeholders and engaging their involvement in the HRH observatory in terms of a stakeholder network (see the stakeholders' theme). Second, developing an organizational interaction between the MOHME with other organizations to transfer HRH data. Next, using electronic health records and the e-government platform created in the country as a data warehouse. Also, there are some control knobs in different deputies of the MOHME that can be used as facilitators like licensing and accreditation of clinics, hospitals, and other health facilities.

"Communication between the observatory and other institutions requires the willingness of senior directors. For example, recently, the minister of health postponed recruiting new HRH because we did not have reliable information" (P17).

The committee of Medical Education Expansion should determine the number of required human resources from each specialty until 2025 for awareness of the current situation and future needs and the number of students who should enter each major annually" (P5).

"It is impossible to connect all organizations at the first step of developing an HRH observatory. We should define communication levels basis on types of organizations in a stepwise approach" (P10, P15).

"Design a cooperation network in the country is the cornerstone to develop an HRH observatory" (P4).

HRH educational system

The educational deputy of the MOHME is responsible for determining the educational needs and capacity of all medical universities. These policies determine in accordance with family physician strategies, referral system and classification of services, and the Iranian national scientific map. Meanwhile, the country's need for HRH will be determined based on the health system vision of Iran in 2025. A weak connection between the educational deputy and human resources department in the MOHME is proposed as the main challenge toward an integrated policy-making process in the field of HRH. Interviewees emphasized that there is a need to promote the interaction among different MOHME deputies to move toward a balance between supply and demand based on the country's need for the HRH. Also, the head of the deputies should participate as members of the steering committee to formulate a national road map in training human resources based on health market demand.

"Membership of the head of education deputy in the national secretariat can be led to plan based on health market needs" (P18).

"As you know, all of the educational decisions in our country made by the educational deputy in the MOHME, so clearly, it is so important having a comprehensive picture in terms of health market needs. It would be accessible with communication between the educational deputy in the MOHME and the HRH national observatory" (P3).

Dimension 3: Prerequisites for implementing an HRH observatory

Under this dimension, there were three related themes: develop a strategy roadmap, key indicators, and HRH Information systems.

A strategy roadmap

The participants commented that the secretariat must be designed to formulate and implement HRH observatory policies by developing a strategy road map and operational action plans with all key stakeholders' participation. The Road map can improve institutional commitments with the involvement of key stakeholders. It would have a major influence on HRH challenges in the field of HRH production, deployment, and performance and ensures effective coordination and harmonization of activities in the health system.

"Sustained political will be achieved by formulating a national HRH road map. The point is we should make a commitment to national documents like the Iranian national scientific map" (P11).

"It needs to have a national Road map that defines actions for scaling up HRH capacity. It is based on the national commitment of stakeholders and partners in the country for improving health service delivery" (P5).

Key indicators

Key indicators (KI) should be selected according to HRH challenges in the health care system. Participants suggested that KI focus on HRH labor force lifespan (pre-entry, in-service activity (health market), and exit). Also, using international indicators provides an opportunity for benchmarking other countries. The list of HRH indicators in the three domains of HRH lifespan was prioritized by interviewees' opinions and also two expert panel rounds (Appendix 3).

"We need all the information of human resources who are working in the health system, not only clinical professionals. Therefore, I suggest that a specialized board determine the final indicators based on the opinion of the stakeholders by using the international indicators" (P14).

"At first, we should answer this question what indicators are essential for the HRH policy-makers in the different fields of education, therapeutic, primary care and so on? The answer is simple, their challenges in the decision-making process would be the most important indicators to

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measure" (P16).

"Focusing on synthesized indicators would be more helpful. After that, you should define data elements for each indicator"(P3, 22).

"We do not have detailed data about Entry, Exit, and Performance of HRH in our country, while these data are critical for HRH planning" (P10).

HRH Information systems

Participants pinpointed that a connection should be tailored between multiple databases due to the scattering of HRH data in various databases within every organization. HRH data should be ultimately compiled from the $HRIS_s$ maintained by various organizations into a national warehouse. Interviewees articulated some challenges that need to tackle for moving into integrated databases. The main challenges included a broad and fragmented range of HRH databases, data scarcity in some areas (i.e., HRH trends, HRH productivity), different definitions of the occupational group and other related elements within each database, and a lack of a similar coding system in HRH databases. Several interventions are proposed to tackle the mentioned challenges, including standardizing the definitions and classifications of health resources, using the international standard classification of occupation (ISCO), definitions, and developing a minimum standard HRH dataset with a clear coding system. Meanwhile, most of the participants suggested using the e-government platform and also the existing database capacity like District Health Information Software (DHIS2), comprehensive health human resource information software (CHHRIS), and HRIS as the HRH observatory data warehouse to merge different databases to a central storage (Table 3).

"You have to look for existing links within HRH databases in the country because human resource data cannot be considered pure. It is necessary to be linked to other databases such as population data, hospital beds, etc., which is not currently possible" (P13).

"The first action into standardization is the development of an HRH data coding system. For instance, the physician identification number can be used for physicians but other professions do not have any identification numbers. I think the best identifier is national code that is unique for all of Iranian" (P17, P21).

Dimension 4: Data management

The routine responsibilities of any observatory are collecting data, processing, analyzing, interpreting, and disseminating to develop evidence-based HRH policies. Therefore, under this dimension, the first theme is data gathering and quality control, and the next theme includes analysis and dissemination (Table 4).

Data gathering and quality control

As mentioned in the previous section, HRH data is scattered among different databases in institutions affiliated with the public, private, social security, military, and charity sectors (see communication mechanism theme). Interviewees suggest that medical universities should assess private and charity sector data because of their disparity in the country. Identifying potential data sources, including dynamic and static data banks, using the existing capacity due to integration among different data sources, and designing a quality control and feedback mechanism were the most important issues. Participants asserted that controlling quality and validity are essential after integrating data in the HRH observatory data warehouse. Data quality can be improved by assessing HRH data sources, using statistical techniques and estimation methods to generate indicators and trending, regular local quality control and continuous feedback to sub-national levels, and training users by the secretariat.

"Based on our previous experience, we attempted to collect extra-organizations' HRH data to develop the HRH road map 2025. Unfortunately, the results were not acceptable. Some organizations, like the army, had not

Table 3. Perquisites for implementing HRH observatory

Dimmention 3: the prerequisite for implementing HRH observatory		
Theme	Category	Sub-category
Develop a strategy roadmap	Priorities in the field of HRH	□ National goals in the field of HRH production, deployment, and performance □ Identify HRH priorities in policymaking in the field of health education and the health market □ HRH planning basis on Involving key stakeholders □ HRH planning basis on participating different related deputies in the MOHME Determine □ Commitment to national documents (the universal health coverage, development plans, Iranian national scientific map)
Key indicators (KI)	Focus on HRH lifespan	□ Use HRH international indicators □ Determine KI by a specialized committee
	HRH challenges	□ Focus on HRH problems and challenges (i.e., mal-distribution, unbalanced size and skill mix, unproductivity)
HRH Information systems (Technical)	Data elements requirements	□ Using national identification (ID) as an HRH identifier □ Standardize the definitions of some basic HRH data elements (i.e., personal details, employment status, salary scale, duty post, and so on) □ Standardize the classification of HRH data elements □ Develop a minimum standard HRH dataset (i.e., employees' personal details, education, and professional details, contacts information, employers' information, salary scales and duty post)
	Hardware and software requirements	□ Development of an HRH data coding system □ Assessment of the existing database capacity □ Designing a national data warehouse

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Table 4. Data management for HRH observatory

Dimension 4: Data Management		
Theme	Category	Sub-category
Data gathering and quality control	Identification of potential data sources	□ Determine potential databases for each indicator
		□ Identification of HRH data producers
		□ Determine required routine- and non-routine data
		□ Consideration of the possibility of data gathering for indicators
		□ Measuring indicators in some stages based on the main problems in the field of HRH
		□ Focusing on key performance indicators
		□ Focusing on accessible data in the first phase, even retrospective data
		□ Tracing of existing information in different deputies because of scattering of HRH data in various databases
		□ Defining required information from other sectors
		□ Identifying and using existence control knobs in the MOHME
	Interaction between data sources (inter- and extra-organizations from the MOHME)	□ Communication with extra-organization from the MOHME
		□ Using policy dialogue as a governance tool to engage with both state and non-state organizations
		□ Prevention from parallel actions in collecting HRH data
	Data accumulation and integration	□ Using the e-government platform
		□ Using the existing databases such as DHIS2, CHRHIS, or HRIS as a data warehouse
		□ Design a national data warehouse in the MOHME
		□ Design an integrated HRH database in several phases
		□ Offline access to HRH data belongs to other institutions (i.e., the military and private sectors)
		□ Develop a core HRH dataset
	Data Quality control in HRH information databases	□ Verifying the predefined standard of data elements
		□ Interaction between technology and statistics office affiliated to medical university and related deputies
		□ Evaluate HRH data quality by an expert committee
		□ Check recorded of data elements by statistics office affiliated to medical university and related deputies
Analysis and dissemination	Analysis	□ Compose a technical committee in the national HRH observatory's secretariat
		□ Synthesis multiple databases
		□ Looking for existing patterns or trends in HRH data
	observatory products	□ HRH Country profile
		□ Policy Brief
		□ Research projects
		□ HRH raw data
		□ Short report
		□ Advocacy newsletter
	Dissemination	□ Design a knowledge transfer platform for sharing evidence from research
		□ Publish HRH evidence on an open access basis
		□ Sharing of the evidence with a series of online talks, policy dialogues, webinars, and so on
		□ policies

intended to provide their data. In my opinion, we should use the e-government platform to connect related databases rather than achieve data offline (P6)".

"We should move to integrity in several steps. At the beginning phase of the project, we cannot force all organizations to connect to the HRH observatory. It would be better focus on intra-organization in initial phase" (P7, P17).

Analysis and dissemination

HRH data should be synthesized to perform dynamic analysis in HRH production, recruitment, availability, composition, distribution, costing, migratory flows, and disaggregated by sex, age, and place of employment. An Expert team in statistics, health information management, health care management, and epidemiology should guarantee the quality, validity, interpretation, and translation of the HRH report. Proposed observatory products include national HRH profiles and special reports (e.g., policy brief, advocacy newsletter, short report, and row data). HRH data can be disseminated in different forms, including raw data, research results, HRH country profiles, and special reports basis on policymakers' needs. The dissemination level of products should be defined by the secretariat of the HRH observatory. Also, it should be determined whether all products can be in the public domain and accessible through the internet or not. However, caution should be exercised about sharing policies. For this reason, a knowledge transfer platform is suggested to help decision-makers make evidence-informed policies by putting the best available evidence from research.

"The reporting periods of KI may vary based on the indicator's definition and the frequency of available data. We should make a decision on the frequency of indicator reporting" (P8).

"An expert panel should compose to confirm the HRH data and to present HRH profile" (P13).

"It is needed to determine indicator's definition, the process of collecting, modeling, and analyzing data, and also reporting periods" (P24).

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Dimension 5: Evidence-informed policymaking

Under this dimension, there were two related themes: HRH evidence productions and HRH evidence utilization network (Table 5).

HRH evidence productions

The interviewees suggested a network for evidence development and utilization in this theme. The proposed evidence development network consists of a national HRH Research Center (HRHRC) and a cooperative association composed of medical universities. Participants emphasized that the HRHRC should interact directly with policymakers to identify key HRH policy questions. Furthermore, they stated that research should be based on issues about HRH that main stakeholders need to inform, such as HRH trends (i.e., aging, feminization, specialization, mobilization) and main challenges (i.e., geographical and skills mix imbalances, unbalanced between demand and supply, unemployment, non-productivity).

"A Health observatory helps policymakers to make decisions timely and accurately. I think policymakers do not yet feel this need because our decisions are based on expert opinions" (P15).

"Research that is done by the HRH research center affiliated with the MOHME was not based on the challenges in the field of HRH. There is not any interaction between us (as the main HRH policy-makers) with the HRH research center" (P2).

"Research priority should determine based on expert panels"(P24).

"As an HRH policymaker, I do not become aware of the HRH research results in our country because we do not have any product except articles that most of which are not intangible for policymakers. We need some policy briefs or knowledge translation documents rather than articles with sophisticated analysis" (P11).

HRH evidence utilization network

The proposed utilization network consists of health planners, policy-makers, managers, and supervisors of health system performance, specialist boards, educational institutions, research centers, researchers, and the public. A practical mechanism should be defined as knowledge translation. Tangible products with user-friendly access were considered essential for moving toward evidence-informed decision-making. Participants in this study offered solutions, including establishing a network of stakeholders, steering committee, universities' network, and a knowledge transfer platform (KTP) as a utilization network. Interviewees proposed that the expert committee prepare evidence in normative graphs and tables rather than formula-based or narrative. It is crucially important that the developed evidence be provided comprehensive, timely, accessible, and reliable information for decision-makers. Participants acknowledged that the observatory would promote an evidence-informed policymaking platform by implementing policy dialogues.

"In the field of HRH research, there are two aspects. One is related to doing practical research, and another is the dissemination of results and their use for policymaking. In my opinion, we should look for a platform that can be copied for various areas such as human resources, finance, research and so on. After creating these networks, some rules regarding the ethical issue, sharing the research results

Table 5. Evidence informed policy-making for HRH observatory

Dimention 5: Evidence-Informed Policy-making		
Theme	Category	Sub-category
HRH evidence productions	National HRH research center	□ Collaboration between the national research center and the HRH departments in the MOHME □ Design a cooperation mechanism between the national research board and research center affiliated with medical universities □ Different regional capabilities □ The existence a national HRH research center affiliated of the MOHME □ Identify the HRH policy concerns and research priorities □ Collaborating Centre for HRH Research in medical universities
	Network of researchers and decision-makers	□ Direct interaction between HRH policymakers and the national research board □ Identify the HRH policy concerns and research priorities □ Doing research based on the main HRH challenges □ The cooperative network consists of several medical universities on the territorial agenda □ A Collaborating Centre for HRH Research in medical universities
HRH evidence Utilization	Policymakers	□ Sharing HRH research findings with the main policymakers □ Creating a better understanding of policymakers and managers of human resource management and planning □ Designing an evidence-informed policy-making platform □ Determine HRH data and research sharing policies □ Reporting the feedback on the results of HRH research to medical universities □ Promote a culture of evidence-based decision-making □ Production of an advocacy newsletter, policy brief, and short reports
	Researchers	□ Design a mechanism for knowledge translation □ Determine HRH Data and research Sharing Policies □ Doing research basis on HRH priorities
	Public	□ Increase public awareness about the current HRH situation □ Impact on population health

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and the level of access could be made" (P5).

"Result dissemination to different target users is the Final function of an HRH observatory. We should have a plan for this publishing the observatory production like research results and HRH data" (P18, P2).

"In our country, there is a weak connection between policy-making and evidence production" (P29).

Discussion

Establishing a national observatory is crucial for the sustainability of any health system. The HRH observatory is considered a cooperative mechanism among different stakeholders to produce reliable and instant data to improve HRH policy decisions. Our results propose a national HRH observatory for Iran consisting of steering, technical and research boards, and also stakeholders' and research networks under the governance of the MOHME. It is required to make comprehensive plans in several steps based on the country's situation to develop an HRH observatory. The stakeholder's network was identified based on their role in HRH development and production of information and evidence. The main aim of the HRH observatory considers monitoring trends in patterns of the HRH for evidence-based decision-making and policy development. Our results propose an evidence development network consisting of a national HRH Research Center (HRHRC) and a cooperative network formed by several medical universities.

Effective stewardship based on networking was considered an essential element for developing an HRH observatory (20). We suggest forming a national observatory led by the MOHME. In order to avoid bureaucracy, the functioning and relationships within the observatory should be found on networking (11). Observatories in Brazil include a network of universities, research centers, and a federal office engaging with human resources issues (16). Appropriate stewardship facilitates shared cooperation among different health care organizations (21).

A stakeholder network as a cooperative mechanism can involve all key stakeholders from the initial planning stages of an observatory until policymaking. However, the insufficient commitment of stakeholders emerged as a challenge in the implementation of policies (22, 12). Additionally, continuous change at the managerial level would have a negative impact on stakeholders' engagement (23). Badr et al. reported that political instability and lack of cooperation of relevant stakeholders had been proven to be an obstacle to national observatories' functioning (11). Also, another study pinpointed that stakeholder networks can form collaborative partnerships between different sectors to encourage coordinated implementation(24). Based on the Global Human resource Alliance report, stakeholder selection would be based on the involvement in education, development, and management of human resource issues (25). To sum up, the primary aim of the HRH observatory is to unite all right partners to work methodically towards improving policy and decision-making in HRH affairs.

Our results highlighted some of HRH observatory prerequisites which are: a strategic road map, key indicators, and HRH information systems. According to WHO's recommendation, the first step in the HRH observatory planning is to formulate strategic objectives in the short and long term in the education and health market (26). In addition, others have added operational guidelines, training manuals, and performance measures as other requirements for the HRH observatory (4, 27, 28). Bhuyan et al. reported that strategic and operational plans should depict the underlying problems and objectives. On the same ground, unclear objectives were introduced as one reason for the failure to implement some of the policies (29). Kebede et al. asserted that it is essential to invest in connecting between inter and intra sectors regarding the multidimensional nature of HRH indicators (30). Kinsella et al. proposed to capture data that already exists, collect minimum data, compose a group for quality control and processing data, and create qualitative feedback systems (31).

Strengthening the existing information systems play a critical role in managing HRH data. For this reason, informatics infrastructures are needed to support the HRHIS and also to move toward an integrated database. Waters et al. reported that the Mozambican system is an actual example of an HRIS built on a local platform with local staff (32). Based on the literature, the challenges of HRIS implementation include weaknesses in logistic supply, information technology infrastructures, access to high-speed computers and the internet, lack of competency, insufficient commitment, and shortage of financial resources (7, 33-35). The coordination between different types of organizations in data-gathering activities can be a facilitator for improving data availability, quality, and comparability for monitoring and reporting HRH initiatives (36).

Availability of information is a crucial issue for any observatory. Regarding the absence of a national registry for HRH in Iran, the first intervention is planning to integrate different information databases. For better policy-making, countries need to have the capacity to generate relevant information in a timely fashion and sufficient quantity and quality (37). To do this, they need to strengthen information resources and enhance the national capacity for data management for evidence-based evaluations. On the same basis, databases should be improved, and the national potential for data management and evidence generation should be increased (30). Some countries have confronted problems in data collection; for instance, in Mozambique, due to the inactivity of the private sector, they focus only on public sector data (32). Pooransingh et al. reported outdated data collection forms, a lack of feedback on the quality of data, and infrequent reporting data were also identified as significant barriers (38). We proposed medical universities as the supervisors for controlling the quality of collected data from the private and charity sectors. Kebede et al. recommended that the empowering of national health information systems by establishing national health observatories would enhance multi-stakeholder participation and strengthen capabilities to produce, attain, and share information (30).

Human resource policies should be based on a sound understanding of the problems, issues, and functional concepts in which they operate and need valid and instant data and information for decision-making (3, 39). In a global HRIS review, Riley et al. concluded despite increased focus

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on the inadequate supply and distribution of HRH in countries, support for the development and evaluation of systems to generate the critical HRH data remains limited (6).

Then, regarding the weaknesses in the production and use of research-based evidence, an efficient and effective mechanism must be designed to produce valid and reliable evidence (4, 40). It would lead to a balance between the supply and demand of HRH by monitoring the composition and distribution of human resources for health (6). Waters et al. reported that after settling the Kenya human resource information system, HRH policies rely on evidence rather than conjecture (41). To sum up, we conclude that stakeholder involvement and a direct linkage between decision-makers and researchers would help move into evidence-informed policymaking. Also, the HRH observatory should establish strong links with policymakers and involve stakeholders in the work.

This study encountered a few limitations; interviewees' suggestions are highly context-dependent that might have an impact on reducing the generalizability of the results. However, the main aspects of any HRH observatory are common to support evidence-based decision-making for each country.

Conclusion

This study investigates elements of a national HRH observatory for Iran. We provide insight into HRH training, deployment, and retention to establish a national HRH observatory. We present the operational and strategic recommendations for action to be taken by relevant stakeholders. Our results emphasize performing comprehensive planning in advocacy, stakeholder involvement, and prerequisites for data management, evidence-based health policy, and actions in the health system. We consider the HRH observatory as a cooperative initiative among key stakeholders to produce information in order to improve human resource policy-making. The proposed HRH observatory model emphasizes networking and stakeholder involvement. Although observatories have common core characteristics and functions from data gathering to policymaking. It needs to adjust based on technical, professional capabilities, ICT infrastructures, and the decision-making process in each country.

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Abbreviation

MOHME: Ministry of Health and Medical Education
HRIS: health resource information system
HRH: Human resources for health
HIS: health information systems
KI: Key indicators
ISCO: international standard classification of occupation
DHIS2: District Health Information Software
CHRHIS: comprehensive health human resource information software
KTP: knowledge Transfer platform
HRHRC: HRH Research Center
ICT: Information and Communication Technology
HCS: health care system

Authors' contributions

ZN: conceptualized and designed the study, participated in data gathering and interpretation of the data, and prepared the first draft of the manuscript.

MA: designed the study, facilitated interviews, and helped to revise the initial draft.

KS: Developing the interview protocol, participated in data gathering and interpretation of the data, and helped to revise the initial draft.

MN: participated in data gathering and interpretation of the data.

YV: designed the study and helped to revise the initial draft.

Conflict of Interests

The authors declare that they have no competing interests.

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Appendix 1. Interview guild

1. Are there any efforts toward HRH observatory or even quasi-observatory at each level, from national to local?
    - If yes, describe characteristics including framework, functions, pros, and cons?
2. What are your suggestions for the HRH observatories' aims and functions? (Based on your knowledge and experience in the field)
3. What is your proposed structure for the HRH observatory (national, province, and district)?
4. Why do you select this structure? What are the pros and cons of different structures?
5. Which sector (inter and extra-ministry) should involve in the HRH observatory?
6. What is your suggested model to involve various sectors in HRH?
7. Which body can be handled the HRH observatory? What is your suggested location, task, and members for the secretariat center?
8. How can we collect the HRH data from other sectors like private, army, charity, or any else? (a proposed mechanism)
9. How can we accumulate and integrate the HRH data in different sectors? (a proposed mechanism)
10. How can we assess the quality of HRH data?
11. What groups (MOH, other ministries, professional associations, universities) should be involved in formulating and implementing national policies for HRH development?
12. Who are the key national and external players in HRH?
13. How can we use the stakeholder forum in the HRH policy development and implementation? (solutions)
    - What is your suggestion about members, functions, interactions?
14. What do the core indicators in order to monitor and evaluate the HRH situation? (Please scoring the checklist)
15. What does the HRH information/data need to be available?
    - Which potential databases can be used for the HRH observatory? How?
16. How do we cover the extra-ministry sector like private associations?
    - Which information structure is suitable for collecting and accumulation the HRH data? How? What are barriers? What is your proposed solution?
17. Are there HRH information databases at each level, from national to local?
18. What mechanisms can be used for data collection, analysis, and feedback, reporting in an HRH observatory system?
19. Is there any relation between planning and policy development units to evidence producer centers in the country?
    - If yes: Are HRH plans or policies based on evidence? (Describe that)
20. Is any office or body using this information for HRH planning?
    - If yes, which body? How?
    - If no: how do we establish a new mechanism?
21. Are results of research used for policy development and planning in the field of HRH?
    - If yes: how and by whom? (Describe)
    - If no: how do we establish a new mechanism? (HRH evidence network)
22. Is there a research network from the HRH information users or providers?
23. Which mechanism can be helpful to identify their research needs in planning units?

Appendix 2. Key stakeholders

- MOHME
- Government (Council of Ministers)
- Parliament (health commission)
- Ministry of Cooperatives Labor and Social Welfare
- Ministry of Education
- Ministry of Economic
- Ministry of Defense
- Ministry of Petrol
- Medical science university
- Non-professional education (Red Crescent, medical universities, private organizations)
- Health Professionals Associations (Medical, Nursing, Dentists, Specialization Board)
- Health insurance organizations
- Passport office
- National organization for civil registration
- Charity organizations in health sector
- Municipalities
- National statistics and information center
- Licensing and accreditation organizations in the field of health

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Appendix 3. Prioritizing HRH indicators

HRH indicators were extracted basis on the literature. The list was comprised of 62 indicators in three parts (i.e., pre-entry, in service activity (health market) and exit). First, we asked all of the interviewees to complete the indicators list (n=30). Interviewees asked to assess the indicators' priority by checklist from 1 (lower priority) to 10 (upper priority). The checklists were collected one week after the interviews. After receiving the checklist (n=25), one investigator entered all of the raw data into the excel software and analyzed it by descriptive tests. Indicators with a consensus of greater than 70% were accepted, and less than 50% were rejected at the first assessment. Also, an expert panel was consisted to assess the indicators score 50% to 70% or having scores upper than seven by two-third of participants. The expert panel consisted of six experts (i.e., three HRH managers, two academicians, one HRH researcher) for finalizing the indicator list. Following the expert meeting that held by using nominal group method, the members were ask to rate the refereed indicators again. Meanwhile all of their suggestions were considered. After rating, one investigator entered all of the raw data into the software program, and numeral difference was controlled by the assistant researcher. The results of analysis were made available and presented to the members at the subsequent meeting, in which the cases with the consensus less than 70% were discussed in details by the members and the members were asked to rerate the indicators to remove them with consensus less than 70%.

In sum, our result shown from 29 pre-entry indicators, 11 indicators were accepted in the first phase, and 14 indicators were referred to the expert panel for discussion. For 26 indicators in the health market, 20 indicators were directly accepted, and six indicators were referred to the expert panel. Exit indicators with 7 cases; 2 indicators were confirmed, and others were referred to the expert panel. In the second phase, the expert panel assessed refereed indicators that 12 and 3 and 2 indicators were included in pre-entry and health market and exit sections, respectively (See table 1). In point of main HRH information, the proposed basic data elements were Identification number, full name, birth History (i.e., date, sex, location), address, contact Information, photograph, education (professional License and Certification), employment (i.e., occupational category, employment status, employment title, facility type and ownership, employment date).

Table 1. HRH observatory indicators

	Indicators	Responsiveness (percent)	Situation
	Pre-entry		
1.	Number of students graduating from elementary school each year	49	Reject*
2.	Number of students graduating from middle school each year	48	Reject*
3.	Number of students graduating from high school each year	57	Reject**
4.	Number of qualified applicants per job opportunity	58	Accept**
5.	Number of applications for health-related science	78	Accept*
6.	The ratio of admissions in HRH education and training programs to available places	82	Accept*
7.	The ratio of students enrolled in HRH education and training programs to qualified educators in a given year	78	Accept*
8.	Number and percent of graduates from health-related science	82	Accept*
9.	Number of professionals licensed	62	Accept**
10.	Number of students graduating from health-related science to population (separated by level and major)	80	Accept*
11.	Number and percent of foreign-trained health workers with a permit to operate	68	Accept**
12.	Accreditation mechanisms for education and training institutions and their programs	68	Accept**
13.	Number of accredited institutions in education and training and their programs	62	Accept**
14.	Assessing the needs of human resources to provide health care services	60	Accept**
15.	Develop a human resources development plan to guide human resource development	58	Accept**
16.	Number of training opportunities per occupation	62	Accept**
17.	The capacity of the clinical lab by occupations	69	Accept**
18.	Number of students to professor by occupations	75	Accept*
19.	Number of books, journals, and library to students by occupation	49	Reject*
20.	Ratio of student's existence per total students by occupation	72	Accept*
21.	Ratio of Professors exit per Specialty	72	Accept*
22.	Cost of Private sector in health training per occupation	65	Accept**
23.	Total expenditure of graduate for health training by occupation	71	Accept*
24.	Ratio of previous year graduates who started practice to total number of previous year graduates	75	Accept*
25.	Percentage of newly active foreign-trained health workers to total stock of active health worker	70	Accept*
26.	Number of graduated foreign health workers applying for a visa per specialty	62	Accept**
27.	Number of visas issued to foreign health workers	62	Accept**
28.	Employment centers	48	Reject*
29.	Number of graduated students who employed 3 mounts after graduating per occupation	65	Reject**

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Table 1. Continued

	Indicators	Responsiveness (percent)	Situation
	In-service activity		
30.	Number of health workers per 10,000 population	81	Accept*
31.	Unemployment rate	72	Accept*
32.	Ratio of active health workers employed by type of speciality	68	Accept**
33.	Percentage of active health workers employed by type of facility ownership	72	Accept**
34.	Percentage of active health workers employed by sector	72	Accept*
35.	Rate of health workers engaging in dual practice	70	Accept**
36.	Average health human resource income by profession	85	Accept*
37.	Stewardship of HWHIS indicators	83	Accept*
38.	Strengthening Indicators of human Resource Information System	81	Accept*
39.	Rate of absenteeism among health workers	60	Reject**
40.	Rate of human resource for health productivity	81	Accept*
41.	Rate of density of human resource for health	83	Accept*
42.	Skill mixed of human resource for health	89	Accept*
43.	Geographical distribution of human resource for health	88	Accept*
44.	Distribution of active health workers in different age groups	80	Accept*
45.	Distribution of active health workers by gender	80	Accept*
46.	Distribution of active health workers by profession	92	Accept*
47.	Distribution of active health workers by speciality level	95	Accept*
48.	Percentage of active health workers employed by type of ownership (public, private not-profit, private for-profit) and facilities	83	Accept*
49.	Rate of flow between public and private sectors	72	Accept*
50.	Rate of flow between geographical sectors	75	Accept*
51.	Rate of flow between different facility	62	Reject**
52.	Rate of flow from employed health workers with a full-time to part-time contract	68	Reject**
53.	Rate of flow by speciality	72	Accept*
54.	Rate of emigrate to foreign country	77	Accept*
55.	Rate of emigrate to country	71	Accept*
	Exit		
56.	Rate of exit from health market	68	Reject**
57.	Rate of emigrate to foreign country	77	Accept**
58.	Rate of leave from health market	69	Reject**
59.	Ratio of unfilled posts to total number of posts in facility	80	Accept*
60.	Number of deaths before retirement	69	Accept**
61.	Ratio of active health workers involuntarily leaving the health sector labour market to total stock of active health workers, by occupation, by sex	68	Reject**
62.	Rate of retried HRH by year	85	Accept*

*Based on interview participants opinion
** Based on assessment in expert panels

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