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

Zhila Najafpour1*, Mohammad Arab2, Kamran Shayanfard3, Yousef Vakili4, Masoumeh Najafi-Gharehbelagh2

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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

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 allocated (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).

Corresponding author: Dr Zhila Najafpour, najafpour-zh@ajums.ac.ir

1. Department of Health Care Management, School of Public Health, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
2. School of Public Health, Tehran University of Medical Sciences, Tehran, Iran
3. Physics and Materials Science Research Unit, University of Luxembourg, Luxembourg
4. Faculty of Management, Kharazmi University, Tehran, Iran

↑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.
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.

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, mal-distribution 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 subcategories. 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 macro-policies, observatory requires a change in the existing structure, which is currently not possible." (P10)

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Observatory on human resource for health (HRH)

"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 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 decentralized system 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).

**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 development | |
|                          |       | Formulate a collaboration model for Inter- and extra-organizations from the MOHME | |
|                          |       | Develop a stakeholder network to improve observatory sustainability | |
|                          | Central organizational interaction | Defining communication levels in a stepwise approach for different organizations | |
|                          |       | Design a communication mechanism and continuous collaboration with the extra-organizations fre the MOHME | |
|                          |       | Interaction between the minister of health with the head of other organizations (i.e., the social security, 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 national 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 fre 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 index 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 observatory | |
|                          |       | 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 national scientific map, and so on) | |
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 resource 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 (Kl) should be selected according to HRH challenges in the health care system. Participants suggested that Kl 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
"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 "

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**Table 3. Perquisites for implementing HRH observatory**

| Dimension 3: the prerequisite for implementing HRH observatory | 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 (Kl)** | Focus on HRH lifespan | □ Use HRH international indicators |
| | HRH challenges | □ Determine K1 by a specialized committee |
| | | □ Focus on HRH problems and challenges (i.e., mal-distribution, unbalanced size and skill mix, un-productivity) |
| **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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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 raw 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).
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

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**Table 5. Evidence informed policy-making for HRH Observatory**

| Dimension 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 | ☐ Reporting the feedback on the results of HRH research to medical universities |
| | | ☐ Determine HRH data and research sharing policies | ☐ 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 |
| | | ☐ Reporting the feedback on the results of HRH research to medical universities | ☐ 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 Fin-
al function of an HRH observatory. We should have a plan for this publishing the observatory production like re-
search results and HRH data" (P18, P2).

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

**Discussion**

Establishing a national observatory is crucial for the sus-
tainability 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 re-
search 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 evi-
dence. The main aim of the HRH observatory considers
monitoring trends in patterns of the HRH for evidence-
based decision-making and policy development. Our re-
results propose an evidence development network consisting
of a national HRH Research Center (HRHRC) and a coo-
perate network formed by several medical universities.

Effective stewardship based on networking was consid-
ered an essential element for developing an HRH observa-
tory (20). We suggest forming a national observatory led
by the MOHME. In order to avoid bureaucracy, the func-
tioning and relationships within the observatory should be
found on networking (11). Observatories in Brazil include
a network of universities, research centers, and a federal of-

cice engaging with human resources issues (16). Approp-
riate stewardship facilitates shared cooperation among dif-
ferent 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 insuf-
ficient 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 col-
aborative partnerships between different sectors to encour-
ge coordinated implementation (24). Based on the Global
Human resource Alliance report, stakeholder selection
would be based on the involvement in education, develop-
ment, and management of human resource issues (25).
To sum up, the primary aim of the HRH observatory is to unite
cut all right partners to work methodically towards improving
policy and decision-making in HRH affairs.

Our results highlighted some of HRH observatory pre-
requisites which are: a strategic road map, key indicators,
and HRH information systems. According to WHO's rec-
ommendation, 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 addi-
tion, 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 under-
lying problems and objectives. On the same ground, un-
clear objectives were introduced as one reason for the fail-
ure to implement some of the policies (29). Kebede et al.
assumed that it is essential to invest in connecting between
inter and intra sectors regarding the multidimensional na-
ture of HRH indicators (30). Kinsella et al. proposed to cap-
ture data that already exists, collect minimum data, com-
pose 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, infor-
matics 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 implemen-
tation include weaknesses in logistic supply, information
technology infrastructures, access to high-speed computers
and the internet, lack of competency, insufficient commit-
ment, 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 ob-
servatory. 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 in-
formation 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 man-
agement for evidence-based evaluations. On the same ba-

is, databases should be improved, and the national poten-
tial for data management and evidence generation should
be increased (30). Some countries have confronted p ro-
blems 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. rec-

commended that the empowering of national health infor-
mation systems by establishing national health observato-
ries would enhance multi-stakeholder participation and
strengthen capabilities to produce, attain, and share infor-
mation (30).

Human resource policies should be based on a sound un-
derstanding of the problems, issues, and functional con-
cepts 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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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: human 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
CHRHS: 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.
KS: designed the study, facilitated interviews, 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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Med J Islam Repub Iran. 2022 (1 Nov); 36.127.
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
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 (quadruply 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 asked to rate the referred 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 consensus with the results 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 referred 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, 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 |
|--------------------------------------------------------------------------|--------------------------|-----------|
| Number of students graduating from elementary school each year            | 49                       | Reject*   |
| Number of students graduating from middle school each year                | 48                       | Reject*   |
| Number of students graduating from high school each year                  | 57                       | Reject**  |
| Number of qualified applicants per job opportunity                        | 58                       | Accept**  |
| Number of applications for health-related science                         | 78                       | Accept*   |
| The ratio of admissions in HRH education and training programs to available places | 82                       | Accept*   |
| The ratio of students enrolled in HRH education and training programs to qualified educators in a given year | 78                       | Accept*   |
| Number and percent of graduates from health-related science               | 82                       | Accept*   |
| Number of professionals licensed                                          | 62                       | Accept**  |
| Number of students graduating from health-related science to population (separated by level and major) | 80                       | Accept*   |
| Number and percent of foreign-trained health workers with a permit to operate | 68                       | Accept**  |
| Accreditation mechanisms for education and training institutions and their programs | 68                       | Accept**  |
| Number of accredited institutions in education and training and their programs | 62                       | Accept**  |
| Develop a human resources development plan to guide human resource development | 58                       | Accept**  |
| Number of training opportunities per occupation                           | 62                       | Accept**  |
| The capacity of the clinical lab by occupations                           | 69                       | Accept**  |
| Number of students to professor by occupations                            | 75                       | Accept*   |
| Number of books, journals, and library to students by occupation          | 49                       | Reject*   |
| Ratio of student’s existence per total students by occupation             | 72                       | Accept*   |
| Ratio of Professors exit per Specialty                                   | 72                       | Accept*   |
| Cost of Private sector in health training per occupation                  | 65                       | Accept**  |
| Total expenditure of graduate for health training by occupation           | 71                       | Accept*   |
| Ratio of previous year graduates who started practice to total number of previous year graduates | 75                       | Accept*   |
| Percentage of newly active foreign-trained health workers to total stock of active health worker | 70                       | Accept*   |
| Number of graduated foreign health workers applying for a visa per specialty | 62                       | Accept**  |
| Number of visas issued to foreign health workers                          | 62                       | Accept**  |
| Employment centers                                                       | 48                       | Reject*   |
| 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 HWHS 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 retired HRH by year                                             | 85                       | Accept*     |

*Based on interview participants opinion

** Based on assessment in expert panels