



Factors Required to Develop Strategic Purchasing for Diagnostic Imaging Services: An Expert Opinion

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Received: 17 Nov 2023

Published: 23 Jul 2024

Abstract

Background: In recent decades, healthcare purchasing has been continuously searching for new approaches to improve performance. The pressure of expensive services resulting from more advanced health technology has increased the necessity of these changes. Strategic purchasing of health services, as a recommended approach, remains unknown in diagnostic imaging services. This study explores the potential determinants of strategic purchasing in the context of diagnostic imaging services.

Methods: This was a qualitative study conducted through framework analysis (applying five stages of familiarization, identifying a thematic framework, indexing, mapping, and interpretation) in 2023 based on the World Health Organization for strategic purchasing. This framework includes 5 questions: what to buy? From whom to buy? For whom to buy? what mechanism to buy? At what price to buy? A dimension of what structure to buy? Data were gathered through semi-structured interviews with key informants in which data saturation was reached in 18 interviews. After transcribing each interview, data were analyzed using MAXQDA software.

Results: A total of 32 factors were identified to be influencing the strategic purchasing of diagnostic imaging services. Development of an evidence-based service package using a prospective combined payment system, consideration of the burden of disease and health needs, implementation of a referral system and family physician program integrated with the electronic health record, and most importantly, political belief and technical capacity are the most important identified factors.

Conclusion: The implementation of a strategic purchasing policy requires a systemic approach to the factors affecting it. A number of specific and sometimes interconnected activities must be carried out in different areas of strategic purchasing. Governance of purchasing is the foundation of strategic purchasing. It is suggested that this item should be investigated more in countries like Iran.

Keywords: Healthcare, Health System Financing, Purchasing, Strategic Purchasing, Diagnostic Imaging Services

Conflicts of Interest: None declared

Funding: This study was funded by Isfahan University of Medical Sciences.

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Cite this article as: Soltan-Tajian A, Shaarbafchizadeh N, Jabbari A, Bastani P. Factors Required to Develop Strategic Purchasing for Diagnostic Imaging Services: An Expert Opinion. *Med J Islam Repub Iran.* 2024 (23 Jul);38:84. <https://doi.org/10.47176/mjiri.38.84>

Introduction

In recent years, there has been a growing interest among researchers, policymakers, and healthcare administrators in understanding the dynamics of strategic purchasing of healthcare services (1-7). This interest arises from the potential benefits of effectively managing services, including increased access, reduced waiting times, better service quality, and cost containment (8-11). Strategic

purchasing is an active, evidence-based approach in which the healthcare provider mix, service mix, and volume are deliberately determined by prioritizing the financing of specific goods and services over others (12). This approach aimed to maximize objectives such as promotion of equity, quality of care, efficiency and responsiveness (10, 13, 14).

Diagnostic imaging services play a crucial role in modern

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↑What is “already known” in this topic:

Strategic purchasing of health care has 5 main dimensions: what services for whom, from which provider, at what price and how to buy?

→What this article adds:

The results of our study showed that structure and technical capacity in each dimension is a prerequisite for the success of this policy. Strategic purchasing governance can be decisive.

healthcare, providing essential tools for better diagnosis, monitoring, and treatment of various medical conditions (2). On the other side, the development of diagnostic technologies has brought increasing costs to health systems (15). The rising demand for such services, coupled with escalating costs and limited resources, has prompted healthcare organizations to rethink their purchasing strategies (7, 16). Strategic purchasing of diagnostic imaging services is increasingly being recognized as a promising approach to optimize resource allocation, improve patient outcomes, and enhance overall healthcare efficiency (2).

Due to increasing costs and diversity of services, this policy seems to play a pivotal role in ensuring the availability of high-quality diagnostic services and effectively managing costs (17). Although the key determinants and challenges associated with the strategic purchasing policy in some health services have been identified (18), it is crucial to understand the dynamics of strategic purchasing in diagnostic imaging services. In this study, we will explore the potential enablers and barriers of strategic purchasing in the context of diagnostic imaging services. Ultimately, the findings presented in this article can inform decision-making and support the development of evidence-based strategies for optimizing the delivery and utilization of these essential healthcare services.

Methods

This was a qualitative study done in 2023. The sample population includes experts in the Ministry of Health (MOH), health insurance organizations (Iranian health insurance, social security insurance, and private insurance) and specialists providing diagnostic imaging services. In order to include individuals with different perspectives, purposeful sampling was used to reach maximum diversity. Inclusion Criteria were at least 3 years of managerial experience related to purchasing health services, mastery over health service purchasing, awareness of the terms and conditions of the health system and willingness to cooperation and participation in the interviews. Based on the inclusion criteria as well as the specific subject area of the study, data saturation has been achieved in 18 participants (Table 1).

The interview guide was prepared based on the WHO framework for strategic purchasing. Initially, two pilot interviews were conducted with experts, and after

modifications, semi-structured interviews were conducted individually. In order to contact individuals through phone calls or emails, an invitation letter along with a research information sheet was sent to participants. The time and place of the interview were chosen based on mutual agreement and preferably at a location in the interviewee's workplace for convenience. At the beginning of each interview, the interviewer provided an explanation about the study and its objectives, the measures taken to ensure the confidentiality of their information and a written consent form signed by the interviewee.

The interviews were recorded with a digital audio recorder. Note-taking was also used. At the end of each interview, the contact information of the participant was gathered in order to facilitate further communication if needed. The average duration of interviews was 30 minutes. After the transcription of an interview, the non-verbal reactions and emotional states related to the interview, the date and time of the interview and other necessary information, were added. A unique code is considered for each interview.

Using the MAXQDA10 software, a five-step framework analysis was used for data analysis. This method includes familiarization, identifying a thematic framework, indexing or coding, charting data, and finally, mapping and interpretation. The research team reviewed and examined codes and summarized codes based on the main research questions.

To increase the credibility and quality of the findings, the first interpretation was sent to the study participants in order to propose possible feedback and modifications.

To ensure the validity and reliability of the study, the Lincoln and Guba evaluation method (19) was used. To this end, four criteria including credibility, transferability, dependability, and confirmability, are considered. The credibility of the research increased by spending sufficient time, confirming the research process with two experts, using two coders to code multiple interview samples to ensure a consensus of coding perspectives, and using objective and measurable questions to increase the reliability of the research data. For transferability, more details were provided regarding the participants and environmental characteristics. Some of these details include demographic information such as age, gender, work experience, and level of education. In order to establish dependability, the research details and note-taking are recorded and documented so that another researcher besides the primary researcher can follow the study's progress for the scientific accuracy of the findings. Finally, for examining confirmability, two researchers identified to reach a consensus on the decisions regarding the collected data and data interpretation. Ultimately, the researcher becomes aware of the extent to which their personal biases and subjectivity have influenced the report.

Data analysis was done through the WHO framework for strategic purchasing. Qualitative data was analyzed through a five-step framework analysis method (familiarization, identifying a thematic framework, indexing, drawing tables and interpretation). After preparing a transcript of the recorded interviews, the researcher reviewed them keeping

Table 1. Participants characteristics

Variable		n
Gender	Male	14
	Female	4
Age	30-40	5
	41-50	9
	51-60	4
Educational attainment	Master	1
	Doctor of medicine	6
Work experience	Doctor of Philosophy	11
	10-20	13
	20-30	5
Organization	Ministry of Health	4
	Insurance Organization	9
	Provider	5

in mind the main goal of the research by summarizing and identifying the codes, and then categorizing them in the main framework. We structured our results based on the WHO strategic purchasing framework including What to buy? From whom to buy? For whom to buy? What mechanism to buy? At what price to buy? And a dimension of What structure to buy? In the final stage, i.e., the mapping and interpretation stage, the findings were described, analyzed and interpreted.

Results

A total of 372 codes were categorized into 32 subdomains that were identified to be influencing strategic purchasing for diagnostic imaging services (Table 2).

What to buy?

Almost all participants have stressed the necessity of developing a comprehensive service package as a prerequisite for strategic purchasing of diagnostic imaging services. Service packages have been defined in the form of basic services, complementary services, and services for special patients. It is necessary to update the service package especially for diagnostic imaging services based on economic evaluation studies and health need assessment reports. Many participants believed that considering the cost-effectiveness of services is important, both in designing service packages and in providing services. However, the economic evaluation perspective will differ

for insurance organizations and the MOH, and it must be considered.

"We should buy a service that is cost-effective, meaning it has effective costs and provides good health benefits, which insurance companies don't cover. There are two aspects to consider: the service should have been provided (service package), and it should be the one I want (quality and cost of service provider)" (P11)

Also, the level of service specified in the guidelines should be implemented. It means that complex services should be provided in case of necessity and insufficiency of simpler services. This will be a lever to prevent unnecessary services. Clinical guidelines were emphasized by most of the participants as a more influential factor in diagnostic services compared to other healthcare services.

"Specific conditions should be set for services so that if these conditions are met, the purchase of those services will take place. For example, I will only buy a lumbar MRI on the condition that the patient has undergone physiotherapy or has had a simple X-ray taken, and after a certain period of time and with a doctor's prescription, I will provide the service" (P8)

One of the integrated factors with the previously mentioned items is the organization of services in the form of referral systems and family medicine. It will be a tool to control services in terms of quality and suitability. Although the achievement of this goal in Iran's health system has been insignificant. The majority of participants suggested the referral system as an integral part of the

Table 2. Affective factors of strategic purchasing of diagnosis imaging services

Domain	Subdomains
What to buy?	<ul style="list-style-type: none"> • Services package • Economic Evaluations • Complementary services • Set Utilization Restricts • Referral System and controlling process of service providing • Guidelines
From whom to buy?	<ul style="list-style-type: none"> • Accreditation and ranking of all identified providers • Database for provider rules and regulation • Service regionalization and control of induced demand • Role of payers in issuing activity licenses • Guidelines
For whom to buy?	<ul style="list-style-type: none"> • Evaluation of health needs and burden of diseases in the catchment area • Distribution of services based on the covered population • Electronic health records • Rational use of services
What mechanism to buy?	<ul style="list-style-type: none"> • Increasing individuals' awareness • Prospective payment system • Payment for level of knowledge used, not expertise • Motivation and encouragement of providers and caregivers • Use of selected contracts • Out of pockets payments
At what price to buy?	<ul style="list-style-type: none"> • Variable tariffs • Harmonization of private and public tariffs • Actualization of service tariffs • Inflation • The political part of tariffs • Definition of tariff levels based on ranking.
What structure to buy?	<ul style="list-style-type: none"> • Legal framework for the implementation of strategic purchasing policies • Determining the ideology of service delivery organization • Stakeholder analysis • Advocacy at a macro level • Explaining the issue of strategic purchasing at a macro level

strategic purchasing of diagnostic imaging services. In this structure, the pathway of service delivery to specific individuals as well as the roles of actors, should be defined.

"Strategic purchasing is reachable within the structure in which the gatekeeping mechanisms of the referral system and similar systems can operate. One of its most important aspects, in my opinion, could be this" (P4), "The pathway of prescribing and delivering services should be under control, meaning that we need to identify the process and ensure its execution." (P2)

After all the above-mentioned items, some participants expressed that there should be utilization restriction based on a time frame for the services provided to individuals to limit the demand for services. In this regard, one of the participants expressed:

"The issue of frequency and the limits set by insurance companies should also be taken into account. For example, a certain diagnostic imaging service should be received only a certain number of times per year. In other words, if I implement this role in my structure, I can say that I have strategic purchasing." (P3)

From whom to buy?

Expanding discretion in choosing between providers has been expressed by the majority of participants. For this purpose, it is necessary to identify all the providers and evaluate them based on the standards and requirements of service provision. Only authorized providers who have complied with the minimum requirements will be eligible. These include principles of the Ministry of Health, compliance with service levels, and establishment of basic standards for center accreditation.

"So, the question of whom to buy from, well, we need to have a list of service providers, meaning first we need to identify who these providers are. Can all centers be included? No, so I have to choose from among the selected centers. That means I have to buy from 500 out of a thousand centers. What conditions should these 500 centers have? (P1)"

It is mandatory for service providers to Comply with protocols and service delivery rules. Due to the potential of induced demand for diagnostic services and unnecessary costs, there should be clear and accessible references to rules and regulations. It is suggested that adhering to the service regionalization law as a supply-side policy will promote the efficiency of funds. The interviewees stressed the role of the service purchaser in the entry of service providers into the healthcare market as an influential variable in strategic purchasing. This variable could be a driving force for the implementation of strategic procurement.

"Regardless, the insurance policies are stricter than issuing a license. If the ministry comes and says you have permission, but I say for these reasons, I won't sign the contract, it means I am even stricter unless we link these criteria with your previous statement in terms of accreditation in these minimum requirements if you have them, you can join the presentation. Therefore, first, we need to determine when we should buy and then determine how we should buy (P8)"

For whom to buy?

In order to have strategic purchasing in diagnostic imaging services, it is necessary to first identify the real health needs of the community and the burden of diseases at the local level; accordingly, facility distribution and service purchasing will occur based on it. Regarding the population demographic characteristics such as age and gender profile, burden of diseases in the local region, wealth generation in the region, per capita income, service delivery organization, and insurance system will be influential factors in strategic purchasing. Some of the statements are as follows:

"Based on health need assessment, we need to see what the properties of the target population are supposed to be covered. When I want to make strategic purchases, I choose them based on needs. So this list needs to be analyzed to precisely determine their logic." (P1)

Organization of service delivery, health needs assessment, and distribution of diagnostic service provider facilities require integrated health information of the population. Electronic health records, as a cross-cutting variable, can facilitate other factors, so it should be considered as a prerequisite for strategic purchasing:

"If we can have individuals' health records based on advances in information technology, regardless of geography, the data must be comprehensive and accessible. Individuals should have the right to access the data wherever they want, but it should follow a systematic approach and not be changed abruptly." (P9)

Despite determining the covered population and establishing health records, it is necessary for individuals to have logical utilization of available services, which is an influential variable alongside other supply and demand policies. Health literacy of caregivers is crucial in all services, and they should be aware of their rights and needs and also have sufficient and appropriate information regarding the quality of service delivery. Similar to other sectors, electronic infrastructures may be required for disclosing the necessary information about service quality, which can also contribute to the credibility and ranking of service providers.

"In my opinion, a series of electronic infrastructures and technologies that are based on standards and regulations may serve as the first decision-making infrastructure that we need. If violations are easily accessible, people's awareness will significantly increase, and their decision-making will be strengthened, which greatly helps strategic purchasing." (P13)

What mechanism to buy?

All participants acknowledged the necessity of shifting from retrospective payment systems (fee-for-service) to prospective payment systems such as global payment and DRG. It is generally accepted that a proper payment system is a key concept determining the success or failure of strategic purchasing of healthcare services. For example, some participants have expressed the following statements:

"Strategic purchasing will definitely lead to a change in the payment system. It is possible to move from fee-for-service payments towards global payments or affiliated

diagnostic group payments. This is done in order to share the risk between the purchaser and service provider. However, in fee-for-service, all the risk is borne by the payer, and this system is not ideal." (P7)

It is suggested that payments must be made based on the expertise used for service providing. This has a significant relationship with the services regionalization tailored to the complexity of the patient's conditions, and it emphasizes that simple conditions do not require complex and expensive services. It should be noted that strategic purchasing of diagnostic imaging services creates a new and firm perspective on incentivizing and penalizing providers. Both positive and negative consequences should be evident for providers who comply or fail to comply with the established framework. One participant expressed their views on this matter, stating:

"Insurance organizations usually apply deductions. Has it ever occurred to them to encourage a well-performing facility? Deduct from the others and provide incentives for those who are doing a job well. Therefore, the payment principles and rules should also change in accordance with our shift in approach, which, unfortunately, we don't have." (P12)

To implement the previous item, a preferred contract with providers who meet the predetermined requirements and standards can be helpful; pertained to compatibility, a service agreement is reached with them based on recommendations. This is like preferred provider organization as one participant expressed their thoughts on this matter as follows:

"If we want to enter into service purchasing in this manner, it somewhat becomes a selective contract. However, it's challenging to determine with whom to contract and whom not to contract. Well, all of these should be linked to evaluation and indicators, which we almost don't have." (P2)

Out-of-pocket payments are also an important concept mentioned by most participants. In previous items, traces of this concept can be seen in variables such as creating utilization restriction and controlling induced demand. It should be noted that strategic purchasing and increased negotiation power regarding services and their prices can have significant negative effects on Out-of-pocket payment, both formally and informally. Therefore, this issue requires careful monitoring and attention:

"In a society where demand exceeds supply for whatever reasons, whether it's a real need or induced demand if you don't have a contract, will the service not be provided or be paid from people's pockets? we need to look at the big picture and make sure the payment system is right, the service package is right, and health literacy is right. It's not like I can make strategic purchases when these things aren't in place." (P11)

At what price to buy?

Due to the improvement of negotiation capacity, the prices are expected to become more competitive and decrease. Participants suggested that a variable tariff based on the volume of services provided should be considered in strategic purchasing. The service's price should change

based on the volume of services and negotiation capacity. According to the participants, the challenge for competition and a demotivating item is multiple tariffs, which serve as a significant barrier to price competition. Most participants have referred to the difference between the announced tariffs and the actual price of diagnostic imaging services as a significant factor influencing strategic purchasing. The tariffs are outdated and often do not cover all expenses, resulting in limited negotiation capacity for service buyers. The incentive aspect of the service tariff should not be ignored either. This will also help to establish distributive justice and facilitate the implementation of laws and regulations. One of the participants expressed tariffs as follows:

"The tariff itself is not set correctly. For example, if the price of a service is 30 units, its actual price could be 50 or 20 units because we have seen this in some packages. So, when you want to make a strategic purchase, and you have to negotiate for a service with a higher actual price, it becomes even more challenging. Therefore, since the initial price is not determined correctly, no one is willing to make a strategic purchase." (P4)

"The tariff is a programmed price. When I say the tariff is zero, it means the price is not really zero because we want to all benefit from it. There comes a time when we increase the tariff because we don't want everyone to receive the service. And when we want someone to use the service, we increase the insurance share." (P15)

In addition to the lack of accuracy and outdated tariffs, it is necessary to consider the impact of inflation on service prices as an important variable. This issue is particularly significant in a non-stable environment which experiences abnormal economic conditions.

What structure to buy?

To implement a strategic purchasing policy for diagnostic imaging services, it is necessary to have legal support, infrastructures and technical capability. The participants expressed that the role and responsibility of the Ministry of Health and insurance organizations should be clarified, and the ambiguity regarding the implementation of strategic purchasing policies needs to be resolved.

"If you tell a company to buy a CT scan, but we don't purchase services under specific conditions, how does this work legally? Because their survival also depends on insurance, and the private sector's economic survival is at stake me. Does the law give me permission for such a thing? And if the individual initiates a legal dispute, can I defend myself or will I face criticism again?" (P10)

The implementation of strategic purchasing is fully dependent on financial resources in such a way that the lack of expected resources by service providers will lead to a return to traditional methods. This issue has been emphasized by all participants. The financial resource shortage practically undermines the functionality of strategic purchasing and disrupts its effectiveness. Therefore, an accurate estimation of service costs should be made within a specified timeframe, and sustainable resources should be considered to ensure timely provision. Different philosophical schools in policymaking

encompass various perspectives, ranging from complete centralization to complete decentralization. The alignment of values, policies, and overarching commitments in the implementation of policies such as strategic purchasing is crucial, and this has been emphasized by some participants. In this regard, it has been stated that the scope of operation for the private and public sectors should be defined:

"The resources allocated to the healthcare system should not be invested anywhere. In reality, we are not clear about our responsibilities; while we want to be controlled like the UK health system, practically, we are expanding the private sector. We import certain devices and then we conduct economic evaluations to determine if we need them or not. Well, how did they enter the country that you are just now deciding? We should have addressed this from the beginning" (P1).

Generally, in any policy implementation, various stakeholders are identified, and they are classified based on their level of impact and alignment with the program. Accordingly, different strategies are adopted to manage them. Participants stated that the main reason for the failure to implement strategic purchasing is mostly due to non-technical and political discussions at the macro level.

"My understanding is that in our country, non-technical aspects are predominant, and they are the main obstacles to the implementation of strategic procurement. The success of strategic procurement relies on garnering support and convincing stakeholders such as the parliament, the health system, the judiciary, and so on" (P7).

Discussion

In this study, the determinants of strategic purchasing for diagnostic imaging services have been identified using the framework of the World Health Organization. The study findings have shown that multiple factors can play a role in the success or failure of implementing strategic purchasing. A systematic view of the identified items indicates their interrelation and mutual influence. Most of the identified variables are similar to other healthcare services (1, 20, 21) and may require some adjustments in certain cases.

Creating governance structures to determine rights and responsibilities is a mechanism for accountability (22). Governments should take two sets of activities to be effective first formulating a national health strategy to provide policy direction and Second, creating an appropriate regulatory framework to ensure purchaser accountability and responsiveness (23). Researchers emphasized the importance of governance aspects by indicating that effective government oversight and the ability to supervise and evaluate stakeholders are essential elements of strategic purchasing (4, 5, 24). Bastani has mentioned that legal capacity and strengthening technical infrastructure can help facilitate strategic purchasing by improving the provision of proper services and cost-effectiveness for the development and management of long-term contracts (20).

The study shows the necessity of developing and institutionalizing an evidence-based benefit package. To the extent that the needs of a broad patient population are

met, the equity of access and allocative efficiency should also be achievable (25). Turning to policies to make decisions based on economic evaluation instead of negotiation and recommendation can provide this aim (26). In providing imaging services to the covered population, it is necessary to consider the level of service complexity required. Providing useless and not cost-effective services contradicts the concept of strategic purchasing. This was recommended by other studies as well (5, 13, 27). Besides, the definition of complementary services, especially in maternity services, is significant. Service providers may propose luxurious and unusual services, which leads caregivers to demand services beyond what they actually need. Therefore, standardization of the primary and complementary services for them should be defined (28, 29).

Population health needs assessment and taking patient viewpoint can be seen as a valuable resource for purchasers to be more responsive and decisions will better reflect the needs and priorities (17). A better fit of purchasers' policies with patients' needs will lead to trust building and better policy implementation (30). Electronic Health Records integrated with the Referral System and Family Physician is a good source of health data and a generally accepted strategy for promoting health equity and optimal utilization of health resources. This strategy, acting as a gatekeeper through qualified physicians, assesses the need for health services and enhances the efficiency of the healthcare system (13, 31, 32). While this important concept is clear in theory and policy, it poses its own unique complexities in practice and requires precise implementation to achieve the objectives. Clinical guidelines complete the referral system and family medicine. It can be said that all influential variables in the type of purchased services can be controlled by using clinical guidelines, and its impact can be seen in all dimensions of strategic purchasing of diagnostic imaging services (2, 32).

On whom to buy from, identifying a set of eligible providers through already-known methods has been emphasized. Using both international standards for accrediting facilities and conducting clinical audits of services proposed to be helpful in provider selection (27). Unfortunately, so far, there is no system for accreditation and ranking of diagnostic imaging services in Iran's health system that can identify top centers, and even insurance organizations have not turned towards this. By actively involving providers in selective contracting, we can encourage competition among them and ensure the delivery of high-quality services in a timely manner, all while keeping costs to a minimum (33). Research conducted in various settings has demonstrated that selective contracting can effectively be used as a tool to manage healthcare expenses (34-36).

Various elements of Strategic Purchasing enable cost control, such as limiting the benefits package, a cap on expenditure, clinical guidelines, using reimbursement mechanisms that enable cost control (capitation and DRGs), and gate-keeping (26). The main concern in how to buy is to shift to the best-fit payment mechanism. Each of the payment methods has its own advantages and

disadvantages, but the emphasis is on the use of a combination of methods with more prospective features, which has been raised in other studies (2, 6, 17). In order to achieve the goals of best quality, lowest cost and justice in access to services, it is necessary to use policy tools such as tariffs in a realistic manner to cover the actual costs of services. If the tariffs are not real, bargaining and competition in the strategic purchase of services will not make sense (1). Therefore, it is necessary for the tariffs to be real and targeted. This issue has been emphasized in other health services (2, 21, 37).

Conclusion

Changing the approach to the strategic purchasing of diagnostic imaging services has many advantages and challenges for the health system. The implementation of this policy requires a systemic approach to the factors affecting it. The governance of purchasing in terms of formulating a national health strategy and creating an appropriate regulatory framework is the foundation of strategic purchasing. It is suggested that this item should be investigated more in countries like Iran. A number of specific and sometimes interconnected activities must be carried out in different areas of strategic purchasing: Development of a service package based on economic evaluations, use of a prospective combined payment system, consideration of the burden of disease and health needs and implementation of a referral system and family physician program integrated with the electronic health record. It is hoped that the use of the findings of this study by health policymakers and executives will lead to improving the efficiency and performance of the health system.

Authors' Contributions

A.ST., N.S. and A.J. designed the study. A.ST collected data N.S, P.B analyzed data. All authors contributed equally in writing and proofing the manuscript.

Ethical Considerations

This study was conducted in compliance with all the principles of professional and scientific ethics. The study protocols were approved by Iran National Committee for Ethics in Biomedical Research with the code no IR.MUI.RESEARCH.REC.1399.095.

Acknowledgment

This study is part of a Ph.D. thesis. The authors express their gratitude to the Research Vice-Chancellor of Isfahan University of Medical Sciences for funding this study.

Conflict of Interests

The authors declare that they have no competing interests.

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