Main Factors Leading to Supplier-Induced Demand in Iran: A Comprehensive Review

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Abstract

Context: Supplier-induced demand (SID) is one of the challenges of health systems, leading to unbearable expenses, particularly for people.

Objectives: The present study aimed to investigate the factors leading to SID in Iran.

Data Sources: The present study is a comprehensive systematic review focusing on studies of SID up to the end of May 2018 in six English databases, five Persian databases, and two search engines. The exclusion criteria were publications in languages other than Persian and English and publications after May 2018.

Data Extraction: A data extraction form was used to record authors’ names and specifications, year of publication, the city of the study, language, purpose, methodology, data collection method, and factors influencing the induced demand. The risk of bias was assessed using a standard risk of bias tool.

Results: We found 514 papers. Eventually, 16 papers met the inclusion criteria, and they were selected for the study. We found 11 papers in the Persian language and five articles in English. The design of 37.5% of the articles was qualitative, 31.25% analytical, 25% descriptive-analytical, and 6.25% descriptive. Factors influencing SID were classified at four levels including meta-level (Ministry of Health and Medical Education (MoHME)), macro-level (universities of Medical Sciences), meso-level (service providers), and micro-level (patients).

Conclusions: According to the results of this research, creating SID can lead to serious challenges for health systems, service providers, patients, and insurance organizations. Therefore, health managers and policymakers need to design appropriate strategies such as adopting the evidence-based approach to purchasing services by the insurer and approval of standards and rules to reduce such SID.

Keywords: Health Service Needs and Demand, Supplier-Induced Demand, Review [Publication Type], Iran

1. Context

The market for health services differs from other markets due to its characteristics, and thus, it requires its specific analysis. One of the features distinguishing the health sector from other economic sectors is the essence of demand. In the health sector, demand is excessively individual, irregular, and uncertain. Besides, physicians, as the sellers of health services, act differently from other professions. The product is not clear and not definitive. These can act as the main distinguishing features of health care services from other commodities. The market supply condition is among other features of the market for health care services in which a professional regulation would prevent free access to new service providers. This, in turn, increases the cost of the services. The asymmetry of information between patients and physicians is another feature of this market that tangibly influences the demand and supply (1-3).

Referring to the literature of the economy, we figure out that studying physicians’ behaviors has a key role in this arena. This significance is highlighted when physicians are considered the leaders of medical teams. No action in the arena of treatment, including drug consumption, surgical operations, etc., can be carried out without physicians’ intervention or agreement. Two salient features of health services, i.e., uncertainty and asymmetry

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of information between patients and physicians, drastically influence physicians’ behaviors (4, 5). In studies carried out on the health economy, the majority of the analyses emphasize the uncertainty and asymmetry of information. There is uncertainty regarding the results of actions taken, which is called the irreducible uncertainty. Given the fact that uncertainty is the most important factor influencing physicians’ behaviors, three factors have been mentioned to contribute to this uncertainty. These factors include: (1) a vast variety of patients with various initial health status, (2) uncertainty regarding the effects of treatment, and (3) unawareness of the patients’ preferences (5-7).

In the economic literature, situations in which there is an asymmetry of information between patients and physicians are entitled brokerage. In such conditions, the employer (patient) is influenced by the actions of the broker (physician). The relationship between the patient and the physician is based on the information superiority of the physician. Therefore, the patient cannot figure out whether the physician’s actions have been sufficiently appropriate or not. Under these conditions, due to the physicians’ superiority to the patients concerning information and their dual role in diagnosis and treatment, the physicians can persuade the patients according to their own will to use health services whose medical values are lower than their costs. This inefficient social prescription is called supplier-induced demand (SID) (8, 9).

One of the causes of SID is insurance and government subsidies. The existence of insurance and government subsidies would lead the patients’ demand to increase. The innovations in health services would increase significantly in response to the SID, and this leads to an increase in GDP. Statistics in the United States indicate an increase in advancements in major health technologies (111%), innovative preventive technologies (150%), and innovations in diagnosis (500%). Whereas the number of innovations is indicative of the quality and level of new products and services, it does not show the use of these new technologies. Statistics on three major diagnostic technologies in the US show a remarkable rise in their use and consumption. The average number of emergency patients receiving MR/CT/PET increased from 13 per 100 patients in 1996 to 58 per 100 patients, which shows an increase of 346% within a decade. The percentage of adult women receiving mammography increased within 20 years, from 24% in 1987 to beyond 68% in 2007 (National Cancer Institute, 2010). The number of colonoscopies performed on outpatients rose from 677 per 10,000 patients in 1996 to 1,778 per 10,000 patients in 2006, showing an increase of 163% in this decade (10-12).

From the viewpoint of policymakers, the SID can give rise to two major effects. First, it increases the health sector expenditures, or it pressurizes the governments’ general budget. Second, it reduces efficiency, as the national resources are spent on health care services that do not bring about much benefit. To summarize, the problems and complications caused by SID include the waste of resources, particularly when the government pays for the physicians’ services, suffering pain, stress, and surgical complications, using unnecessary drugs, the increase of fake demand for services, and creation of a black market in the health system (11, 13).

Supplier-induced demand is one of the challenges that the Iran health system is facing. It has caused an increase in the patients’ out-of-pocket payments and massive expenses (14). It is worth mentioning that the SID occurs when the physicians’ income is dependent on the number of services provided by them, and when the patients’ expenses are covered by health insurance. Since such conditions exist in Iran’s market for health care services, the significance of studying this issue is further highlighted (15, 16). Therefore, there is a need for strategies to adopt scientific methods based on service purchase by insurance companies, modify the fee-for-service method, develop and issue standards and regulations, and design frameworks for reasonable, efficient, scientific treatment so that the provision of unnecessary services is controlled and resources are allocated efficiently (16-20).

Massive changes in the health care provision system, execution of the Health Development Plan in recent years, and the increase of financial commitments of the health system, on the one hand, and the necessity for coming up with practical solutions to reduce unnecessary costs, on the other hand, increasingly emphasize the importance of SID. The comprehensive identification of all factors affecting SID can help revise and reform the country’s health system. Therefore, it is necessary to find the factors affecting SID and the right solutions to tackle this phenomenon to help the country properly spend its resources in the health sector, take a useful step to improve the efficient management of the health system, reduce the challenges between providers and buyers, control the increasing health care costs in Iran and ultimately, improve the quality of services for patients. Policymakers and health professionals may not have enough time to collect, evaluate, and integrate the whole relevant literature. A comprehensive systematic review fulfills this important task and answers such questions for decision-makers. Thus, the main purpose of this comprehensive systematic review is to improve decision-making by recognizing different dimensions of SID. This will provide insight into the current condition of healthcare in Iran. This research attempted to determine the influential factors on SID in health services via a systematic approach to previous studies of SID in Iran.
2. Objectives

A comprehensive systematic review was carried out on previous studies of SID for investigating the factors leading to SID in Iran. The following research questions were addressed:

1. What are the factors leading to SID?
2. Which factors are most important to create SID?

3. Evidence Acquisition

In this review, the Preferred Reporting Items for Systematic Reviews (PRISMA) statement was used as a guideline (21).

4. Data Sources

To find studies published between May 2018 and March 2005, we retrieved articles published in foreign and domestic journals, as well as those available in Persian databases including IranMedex, MagIran, IranDoc, SID (Scientific Information Database), Medlib, and English databases including PubMed, Scopus, Embase, Web of Science, Web of Knowledge, Cochran database, and search engines of Google and Google Scholar. The search strategy included the use of Persian and English keywords and a combination of them. Also, the reference lists of published studies were examined to choose further studies.

5. Study Selection

The keywords used in this search included MeSH and common keywords related to the topic such as "induced demand" OR inducement OR "created demand" OR "initiated demand" OR "demand creation" OR "financial incentive" OR "physician utilization" AND supplier OR hospital OR "health system" OR "health care" OR "health service" OR "physician office" OR clinic AND Iran. We extracted the full texts of all searched articles and documents. After studying the titles of articles, we excluded duplicated articles. Then, the researchers carefully examined the texts of studies and selected the relevant studies.

5.1. Inclusion and Exclusion Criteria

We selected studies if they were observational (cross-sectional, case-control, cohort) and qualitative studies examining the influential factors on SID in health services, studies published in the Persian and English languages, and studies published until May 2018. We excluded studies if they were books, Randomized Clinical Trials (RCTs), case reports, case series, gray literature, dissertations, and editorials, had unavailable full-text articles, and reported overlapping results.

A total of 516 articles were extracted, 44 of which were eliminated because of being repetitive. Then, the articles’ titles and abstracts were screened considering the inclusion and exclusion criteria. Thus, 450 irrelevant articles were eliminated. Of 22 remaining articles, one review article was excluded; five others were excluded due to not investigating the influential factors on induced demand. In the end, 16 articles were selected for the final analysis. The screening process and the results of searches are depicted in Figure 1.

6. Data Extraction

Data were extracted into Microsoft Excel 2013 spreadsheet for the objectives of this review. Two authors (Mahnaz Afshari and Parvaneh Isfahani) extracted all data and they were independently checked by the third and fourth authors (Ebrahim Hasanzadeh and Amir Rakhshan). A data extraction form, based on the study objectives, was used to collect the data. This form comprised some sections including authors’ names and specifications, year of publication, the city of the study, language, purpose, methodology, data collection method, and the influential factors on the induced demand.

7. Risk of Bias in Individual Studies

Four authors (Mahnaz Afshari, Parvaneh Isfahani, Ebrahim Hasanzadeh, and Amir Rakhshan) independently analyzed the methodological quality of the selected studies. The fifth author (Hesam Seyedin) was consulted when the agreement was not reached. For qualitative studies, we used Spencer’s tool (22). We used Mitton’s checklist for quantitative studies (23).

8. Results

Between January 2005 and May 2018, 16 articles were published on the influential factors on SID in Iran (Figure 2). Out of these, 11 articles (68.75%) were published in the Persian language and five articles (31.25%) in the English language. The design of 37.5% of the articles (six studies) was qualitative, 31.25% (five studies) analytical, 25% (four studies) descriptive-analytical, and 6.25% (one study) descriptive (Figure 3).

Based on these studies, various factors can influence the SID. The most important factors in this arena are: (1) the economic problems existing in the health system such as
the physicians’ employment and payment contracts, inappropriate medical tariffs, and inefficient payment system; (2) factors related to the inefficiency of the health market such as the complicated nature of medicine, multidimensional nature of health phenomenon, asymmetry of information between providers and consumers, and clinical un-
The MoHME has an important role in creating the induced need. The lack of sufficient supervision of physicians’ performance can prepare the ground for creating SID. Medical indications are not investigated and supervised properly. This supervision happens after physicians prescribe the wrong medical services. For example, Keyvana et al. believe that in the healthcare system, physicians act as both supervisors and decision-makers, which makes physicians' interests more important than patients. Another factor leading to SID is the complexity of medicine. Bickerdyke et al. noted that the more complicated and uncertain a service is, the higher the potential induced demand will be. Poor regulations and inappropriate execution of health system policies may give rise to SID. The lack of a common treatment protocol among physicians has further complicated the supervision. Clinical guidance is not sufficiently used in Iran’s health system. Put differently, the clinical guidance is not provided with necessary structures and regulations. Therefore, physicians are not obliged to observe the principles of such guidance.

An increased load of expenses due to the induced unnecessary services results in the reduction of the budget allocated to other sectors of health, particularly public health and prevention. The massive use of drugs and imported equipment without necessary indications would lead to the loss of currency. Besides, increases in diagnostic and treatment expenses are among the salient effects of SID. The SID would even bring about an unnecessary increase in the expense of each service. The heavy paraclinical expenses are tangible, which plays a key role in increasing the expenses. For example, Amporu noted that SID could increase medical expenses and impede the development of the health sector. Culture and advertisement also play an important role in SID. In fact, in Iran, the community has undergone a medicalization process. This has caused everything to adopt the framework of medical services. Patients with poor knowledge and awareness can be gradually persuaded to seek unnecessary medical services. The increase in the number of specialists can play a key role in increasing SID. Disturbances in the balance of supply and demand in the market for health services may encourage specialists to advertise unnecessary medical services to attract more patients. Lien et al. remarked that the number of competitors in the market is an important factor in creating SID.

The SID leads to a raise in uncontrollable medical costs, imposing unnecessary expenses, and further pressure on insurance companies. This may increase the debt and disturb the financial balance of insurance companies and their related organizations. The restricted resources of such insurance companies cannot be managed to cover the ever-increasing demand. In conclusion, the liability and debt of insurance companies to the hospitals and other health sectors will increase. This, occasionally, causes insurance companies to terminate the sections of their agreements and contracts.

The universities of Medical Sciences can prepare the ground for SID. For example, the increasing number of physicians in proportion with the population of the province may play an important role in increasing the health sector expenditures, which can be because of the facilitated access to medical services in underprivileged areas and supplier- or physician-induced demands in the affluent regions. Karimi et al. indicated that with an increase in the ratio of physicians to the population, the demand for health services by households living in each province would increase. This increase, up to a certain degree equal

9. Discussion

This study was carried out to systematically investigate the factors affecting SID in Iran’s health system. We found 16 articles published regarding the factors influencing SID in Iran between January 2005 and May 2018. Studies indicated various factors related to the MoHME, universities of Medical Sciences, service suppliers, and patients that influenced this demand.

The number of articles published on SID in health services in Iran. Factors influencing SID were classified at four levels for better understanding. These levels include meta-level (Ministry of Health and Medical Education (MoHME)), macro-level (universities of Medical Sciences), meso-level (service providers), and micro-level (patients).

Figure 1. Methods used in studies of influential factors in induced demand

| Type of Study          | Number of Articles |
|------------------------|--------------------|
| Analytical Study       | 5                  |
| Descriptive-Analytical Study | 4              |
| Descriptive Study      | 1                  |
| Qualitative Study      | 6                  |
to 3.45 physicians per 10,000 people, happened because of the ease of access to medical services in underprivileged areas. After this proportion, the SID severely increased with the ease of access to health services and the created competition (20). Jurges indicate that the density of physicians in an area exerted a significantly positive effect on the decisions of patients that had government health insurance to refer to physicians for the first visit and for further visits. On the other hand, the density of physicians did not influence the behaviors of patients that had private health insurance for their first visit; however, for further visits, it significantly influenced the patients’ behaviors (30).

The lack of strong supervisory mechanisms for ethical issues by the universities of Medical Sciences is another factor contributing to SID in the hospitals. The universities’ supervision of health service providers is not carried out appropriately. The attention is usually paid to what the physicians prescribe and not to the accuracy of prescription. On the other hand, the educational system has an important role in giving rise to SID. For example, Keivanara et al. indicated that one of the reasons for carrying out unnecessary medical services was inefficient educational models, which led to the lack of sufficient skills and capacity to diagnose the patients’ problems and diseases (8).

Service providers can have an influential role in creating SID. One can mention the inappropriate payment methods and wrong physicians’ tariffs. Various payment methods and compensatory mechanisms can have a marked influence on their professional behavior, profiteering, and their performance to benefit themselves (16, 21, 31, 32). Studies indicate that the payment system for physicians has a direct relationship with the increase of services provided (33-35). Giuffrida and Gravelle, in a study about the market of night shift visits in primary care, concluded that the increase of payment and visit tariffs led to an increase in the number of visits by general practitioners. Managing the patients’ demand to increase the payment is indicative of SID by general practitioners in this study (36). Studies indicated that some factors had statistically significant effects on SID, including the type of the payment contract of physicians, especially the payment system for night shifts in primary care (36), the number of laboratory experiments and visit times of level-one physicians in Norway (16), the increase in caesarian sections (37), and the increase in the expenses of prostate cancer in the United States (38).

The commercial approach in treatment has turned the patient into a commodity and disrupted the health-centered attitude. Nowadays, we are facing the phenomenon of the medical market. This market has created unhealthy competition among service providers who merely seek financial profits and disregard the patients’ interests. Ferguson, for example, noted that one of the reasons for SID is the highlighted role of the market in health care services (39).

The patients’ and physicians’ asymmetry of information can prepare the ground for SID. Physicians’ power in the market depends on the asymmetry of information and physicians may exploit this condition for profiteering purposes. Peacock et al. noted that a physician might convince patients that they need further and more intensive treatment (40).

Besides, patients can influence the SID in different ways, one of which is patients’ inappropriate requests form physicians, which can be considered a serious ethical concern. In this type of ethical concern, the patient asks the physician to provide unnecessary treatments, which is particularly the case of patients with health insurance coverage. Sorensen et al. indicate that an ethical concern is the excessive use of health care due to insurance coverage (34). Also, Broomberg et al. note that health insurance coverage leads to increased unnecessary demand for health services. Occasionally, patients refer to physicians without any specific reason, which can pave the way for SID. On the other hand, patients expect physicians to prescribe more drugs even if patients themselves pay for the services. Fabbri et al. in 2001 indicated that SID influenced the competitive allocation of services and resources (37).

Another cause of SID is modernized needs. Today, health needs have undergone many changes compared to the past because of changes in disease patterns, patients’ lifestyles, and technology. Fabbri et al. and Lien et al. showed that the epidemiologic changes, development of needs, demographic changes, and a variety of tastes have contributed to SID (29, 37).
9.1. Conclusions

The results of this study elucidated numerous factors related to the MoHME, universities of Medical Sciences, service providers, and patients to affect the rise of SID in the Iran health system. In this article, it was tried to map all factors affecting SID to provide insight into the current condition of healthcare in Iran. Because of the review was limited to studies published in English and Persian, the results should be used cautiously in terms of generalizability to other countries. One of the strengths of this study was its comprehensiveness and systematic approach to searching medical databases.

The SID can cause unpleasant challenges for the health system, leading to reduced efficiency, inappropriate allocation of resources, and disrupted positioning of treatment and medicine. On the other hand, insurance companies have to suffer increased unnecessary expenses because of SID, eventually leading to their debt and liability. The patient also suffers the complications of SID, which can lead to social, economic, and other challenges. These factors should be addressed with targeted strategies to improve the health system. Therefore, health managers and policymakers need to design appropriate strategies such as adopting an evidence-based approach to purchasing services by the insurer and approval of standards, rules, and clinical guidance to reduce such SID.

Supplementary Material

Supplementary material(s) is available here [To read supplementary materials, please refer to the journal website and open PDF/HTML].

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Footnotes

Authors’ Contribution: Mahnaz Afshari and Hesam Seyedin designed research. Mahnaz Afshari and Ebrahim Hasanzadeh conducted research. Mahnaz Afshari and Parvaneh Isfahani extracted the data; Mahnaz Afshari, Hesam Seyedin, Ebrahim Hasanzadeh, Amir Rakshand, and Parvaneh Isfahani wrote the paper. Mahnaz Afshari has primary responsibility for final content. All authors read and approved the final manuscript.

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Table 1: Factors Influencing Supplier-induced Demand Based on Levels

| Levels                                      | Factors Leading to Supplier-induced Demand                                                                 |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| **Meta-level: Ministry of Health and Medical Education** | Poor implementation of policies of the health system                                                       |
|                                             | Poor implementation of the referral system                                                                  |
|                                             | Wrong policy-making and regulations                                                                       |
|                                             | Lack of a tax system                                                                                        |
|                                             | Several confusions in policy-making institutions                                                            |
|                                             | The increasing number of specialists                                                                        |
|                                             | Weakness in the educational system                                                                         |
|                                             | Lack of national information systems                                                                       |
|                                             | Governmental supplementary insurances                                                                     |
|                                             | Health care as a priority of health systems                                                                 |
|                                             | Promotion of domestic products                                                                            |
|                                             | Promotion imported products                                                                                |
|                                             | Physician-oriented marketing                                                                               |
|                                             | Payment system                                                                                             |
| **Supervision**                             | Lack of sufficient supervision of service providers                                                         |
|                                             | Lack of supervision of the base and supplementary insurance companies                                       |
|                                             | Lack of supervision of the role of pharmaceutical, producing, importing, and medical equipment companies in induced demand |
|                                             | Lack of supervision of advertisement                                                                       |
| **The essence of the health sector**        | Complexities of medicine                                                                                   |
|                                             | Multidimensional nature of health phenomena                                                                |
|                                             | Clinical uncertainty                                                                                       |
| **Macro-level: universities of Medical Sciences and insurance system** | The increasing number of physicians in proportion with to provinces’ population                            |
|                                             | Lack of supervisory ethical mechanisms by universities                                                     |
|                                             | Insufficient education and training                                                                        |
| **Universities of Medical Sciences**        | Lack of insurance supervision of prescriptions and health care services for outpatients                    |
|                                             | Infeasibility of supervision of the accuracy of physicians’ recommendations in insurance systems            |
| **Insurance system**                        | Supervision of insurers limited to committed services quantitatively                                       |
|                                             | Inclusion of supplementary insurance in health care coverage                                               |
|                                             | Non-specificity of supplementary insurances                                                                |
|                                             | Profiteering approaches to supplementary insurance                                                        |
| **Asymmetry of information**                | Physicians’ agency roles                                                                                    |
|                                             | Unnecessary regular visits                                                                                  |
|                                             | Physicians’ authority in patients’ compliance                                                              |
| **Work conditions**                         | Lack of physician’s job security in the initial years of services                                         |
|                                             | The type of physicians’ contract and inappropriate medical tariffs                                         |
| **Meso-level: service providers**           | Workflow of offices                                                                                       |
|                                             | Physicians’ independence from insurance companies and their contracts                                       |
|                                             | Physicians’ insufficient knowledge and skill                                                                |
|                                             | Physicians’ freedom in providing different health care services                                             |
| **Medical ethics**                          | Financial and personal motivation of physicians                                                            |
|                                             | Disregard of medical ethics                                                                                |
|                                             | Creation of a competitive atmosphere                                                                        |
|                                             | Not allocating sufficient time to visiting patients                                                         |
|                                             | The family physician’s earning income using unnecessary medical services                                    |
| Micro-level: patients | Asymmetry of information |
|----------------------|-------------------------|
| Admitting too many patients beyond physicians’ capacity |
| Competitions among physicians |
| Physicians’ economic problems |
| Physicians’ tendency to maximize profits |
| Compensating for physicians’ infringed rights |
| Lack of patients’ awareness of their health status and services |
| Repeated visits |
| Referral to a physician for minor problems |
| Obsessive concerns |
| Increasing patients’ referral with supplemental insurance |
| Compliance with physicians’ recommendations |
| Excessive patient confidence in the physician |
| Patient’s inappropriate requests from the physician |
| Patient’s desire to use more free and non-franchise services |
| Modern demand |
| Patients’ fear of losing their physicians |
| Insurance coverage and inappropriate demand from physicians |