The main factors of supplier-induced demand in health care: A qualitative study

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Abstract:
BACKGROUND: Induced demand is a major challenge for financing health promotion, whereby providers exploit patients’ information gap to manipulate their demand for health care. The purpose of this study was to identify the factors associated with induced demand for health-care services in hospitals affiliated with Iran University of Medical Sciences (IUMS) in 2018.

MATERIALS AND METHODS: In this qualitative study, semi-structured interviews were conducted with 20 participants from IUMS hospitals, including faculty members, physicians, public hospital managers, patients, and researchers with academic and practical experience. Inductive content analysis was used to analyze the data.

RESULTS: Overall, 24 subthemes or factors were identified and classified into the health system, the insurer, health-care provider, and health-care recipient themes. Poor monitoring and control, the fee-for-service payment system, limited role of insurance companies, insufficient monitoring of insurance companies, the educational nature of our health centers, health-care providers’ interests, and patients’ information gap were some important factors in induced demand for health-care services.

CONCLUSION: Our results showed that there are many factors that contribute to induced demand for health care. Given the four levels of factors identified in this study, health policymakers and managers must develop strategies at each level to reduce induced demand for health care.

Keywords:
Demand, financing health promotion, hospital, induced demand, supply

Introduction

In the past three decades, costs of health-care provision have dramatically increased throughout the world.[1] Various macroeconomic factors such as income level, technical progress, and age composition of the population are often proposed to explain these rising costs. In addition, economists and policymakers emphasize the economic efficiency of health insurance systems, demand-side inefficiencies, and potential supply-side inefficiencies as factors that induce demand for health care.[2]

Induced demand is a long-debated topic in the field of health economics. It is defined as the change in demand for health care associated with the discretionary influence of providers, especially physicians, over their patients.[3] As a complex and multidimensional phenomenon, induced demand is a major challenge for health systems worldwide that creates an imbalance between needs and available resources, thus increasing patients’ share in health-care costs and the incidence of catastrophic health expenditure.[4]

Induced demand undermines efficient allocation of national resources, even when
all the costs are paid by the patients. This situation can disturb the balance of supply and demand in the health-care market while imposing additional burden on the patients. At times, incorrect diagnosis and/or treatment lead to medical complications for care recipients. From a health policy perspective, induced demand raises two main concerns. On the one hand, it increases health spending and puts burden on government budgets. On the other hand, it affects efficiency since a higher share of a nation’s resources is devoted to health care with few benefits. Moreover, induced demand for care could result in massive economic loss at the national level, especially when the government subsidizes for medical services and drugs.

The research by Milton Roemer was the first study of supplier-induced demand, which became known in the health-care market as the Roemer’s law. This law states that “a hospital bed built is a filled bed.” Although this theory has been proposed for hospital care, it can be extended to services offered by physicians, i.e., physicians can “create” demand for their services. Inefficiencies in health-care provision incentivize the provision of unnecessary services that waste resources and impose additional costs on patients.

In addition, financial factors such as inefficient payment systems may also contribute to induced demand; for example, if physicians are not happy with the payment system, they may be incentivized to offer unnecessary or redundant procedures. Fee-for-service (FFS) systems could encourage health-care providers to provide unnecessary care, while salaried physicians may not have the incentive to induce demand. For example, Reynolds and McKeel in China showed that physicians overprescribed antibiotics because they shared in the profit made by pharmaceutical suppliers and hospitals.

Furthermore, insurance and government subsidies are important factors in induced demand for care as they shift the patient demand curve to the right. Medical innovations increase significantly in response to supplier-induced demand and growth in per capita health-care spending. The US statistics indicate that in the second half of the 20th century, the number of major advances in medical technologies, new preventive technologies, and diagnostic innovations increased by 111%, 150%, and 500%, respectively. Statistics related to three major diagnostic advances in the US indicate a significant increase in usage. The average number of emergency patients receiving magnetic resonance imaging (MRI)/computed tomography (CT)/positron emission tomography scans increased from 13 per 100 population in 1996 to 58 in 2007, a 346% increase in this period. Percentage of women having a mammogram increased from 24% in 1987 to 68% in 2007 (National Cancer Institute, 2010). Outpatient colonoscopy visits per 10,000 population increased from 677 in 1996 to 1778 in 2006, a 163% increase over a decade. Therefore, the purpose of the present qualitative study was to investigate factors of supplier-induced demand for health-care services in the Iranian context through semi-structured interviews with faculty members, physicians, public hospital managers, patients, and researchers with academic and practical experience.

**Materials and Methods**

As the induced demand is considered as a negative behavior, regarding only the physicians’ experience may result in underreporting and miss useful information. Therefore, a qualitative research was conducted on a purposive sample of twenty different stakeholders including five faculty members, eight physicians, two public hospital managers, three patients, and two researchers with academic and practical experience. To investigate the participants’ opinions about supplier induced demand for health-care services, twenty semi-structured interviews were conducted between August 2018 and March 2019 in hospitals affiliated with Iran University of Medical Sciences (IUMS).

All interviews were done by the author M.A. who had formal education in interviewing. Interviews were conducted with an appointment and at the participants’ workplace. On average, each interview lasted about 36 min (30–45 min). Interview transcripts were e-mailed to the participants on their request for confirmation and possible modification of their comments. Transcripts were 4–10 pages long.

To collect the data, an interview guide was developed based on the literature on induced demand for health care. This semi-structured interview guide had four questions concerning main factors influencing the induced demand in health services, the effective methods for reducing induced demand, the impact of induced demand on medical processes, and identify the health services with the most induced demand in Iran health services. In-depth and exploratory questions were asked based on the type of answers to find the depth of participatory experiences such as please explain more about this – why – how and how.

Three pilot interviews were conducted to optimize the questions, enhance the interviewer’s communication skills, and increase the validity of the research. Interviewees were selected using purposive and snowball sampling techniques and interviews continued until saturation was reached. Interviewees were coded with the letter “M.” To prevent bias and get a consensus, all researchers participated in the process of analysis. To
increase the validity and trustworthiness of the analysis, the faculty members and participants checked themes and codes to receive consensus over any interpretations.

Data were analyzed using inductive content analysis. This approach allowed for discovering new knowledge from the data. The inductive approach avoids the use of predefined categories to allow for categories and codes to emerge out of the data. The researchers fully focused on the data to obtain new insights. Data analysis began with listening to the recordings and reading the transcripts multiple times to gain a general understanding. Then, the transcripts were examined verbatim to extract the codes. This process continued from extraction to the labeling of the codes. In the next stage, the codes were categorized based on their similarities and differences. Finally, quoted evidence from the texts was used for each concept. Data analysis was performed using MAXQDA 10.

Ethical considerations included complying with the IUMS ethics code (IR.IUMS.REC 1396.30888), acquiring informed consent, asking permission to record interviews, maintaining confidentiality, and avoiding bias in data collection, analysis, and reporting.

**Results**

Most participants were male (80%) and married (100%) with a doctor of medicine degree (80%) and 10–20 years of experience (40%) [Table 1].

All the factors associated with supplier-induced demand for health-care services were extracted from the data analysis and were classified into four themes: health system, the insurer, health-care provider, and health-care recipient. The themes were subdivided into 24 subthemes or factors [Table 2].

**Theme 1: Factors related to the health system**

The interviewees mentioned a number of factors in induced demand for health care that arise from the health system, including monitoring and control; FFS payment system; medical guidelines and protocols; nature of the health system; weak health information technology systems; ineffective referral system; financing method; dysfunctional tax system; educational nature of health centers; and health policy.

In general, one of the most important factors influencing the induced demand is insufficient monitoring. Two samples are mentioned here: ‘The most important factor in induced demand is the lack of a proper monitoring and an effective referral system and whether there is an intermediary between the provider and the recipient. Whenever there is information

**Table 1: Demographic characteristics of the interviewees**

| Variable          | Frequency (%) |
|-------------------|---------------|
| Gender            |               |
| Female            | 4 (20)        |
| Male              | 16 (80)       |
| Age (years)       |               |
| <30               | 0 (0)         |
| 31-40             | 4 (20)        |
| 41-50             | 14 (70)       |
| >50               | 2 (10)        |
| Marital status    |               |
| Single            | 0 (0)         |
| Married           | 20 (100)      |
| Experience (years)|               |
| <10               | 4 (20)        |
| 10-20             | 8 (40)        |
| 21-30             | 6 (30)        |
| >30               | 2 (10)        |
| Education         |               |
| Bachelor of Medicine | 0 (0)     |
| Master of Medicine | 4 (20)      |
| Doctor of Medicine | 8 (40)      |
| Doctor of Medicine with specialization | 8 (40) |
| Employment        |               |
| Fixed term        | 17 (85)       |
| Contractual       | 3 (15)        |

**Table 2: Factors in supplier-induced demand for health-care services**

| Themes          | Subthemes/factors                                                                 |
|-----------------|----------------------------------------------------------------------------------|
| Health system   | Monitoring and control                                                           |
|                 | Fee-for-service payment system                                                   |
|                 | Medical guidelines and protocols                                                 |
|                 | Nature of the health system                                                      |
|                 | Weak health information technology systems                                        |
|                 | Ineffective referral system                                                      |
|                 | Financing method                                                                 |
|                 | Dysfunctional tax system                                                         |
|                 | Educational nature of health centers                                             |
|                 | Health policy                                                                    |
| Insurer         | Limited role of insurance companies                                              |
|                 | Insufficient monitoring of insurance companies                                   |
|                 | Lack of development in private insurance and supplemental insurance              |
|                 | Violation of insurance regulations and arrangements                              |
|                 | Lack of development in evidence-based policymaking                                |
| Health-care provider | Interests of the health-care provider                                            |
|                 | Legal consequences (legal and medicolegal burden)                                |
|                 | Requests without medical indications                                             |
|                 | Agency                                                                            |
|                 | Physicians’ employment contract with the hospital                               |
|                 | Influence of pharmaceutical companies and medical device manufacturers            |
| Health-care recipients | Cultural issues and patients’ information gap                                   |
|                 | Low deductible                                                                   |
|                 | Patients’ distrust of the country’s health system                                 |
asymmetry between physicians and patients, there is incentive to induce demand. As long as there is no intermediary to fill this information gap, this problem will persist.” (M1) (insufficient monitoring; ineffective referral system; and information asymmetry). “… We don’t even have the right monitoring mechanisms and our information systems aren’t up to par either.” (M2) (insufficient monitoring and weak health information systems).

Educational nature of the health system is another factor that is mentioned by the interviewees, for example: “Another factor in induced demand is the educational nature of our health centers. For example, some centers perform redundant CT scans or angiographies just for demonstration to students” (M3).

Dysfunctional tax in health system is one of the factors leading to induced demand. Below is a sample of comments made by the interviewee: “The tax system itself fosters certain behaviors. Our tax system should be linked to our information systems. Some countries implement a progressive tax system for physicians. For example, those earning $100,000 are taxed at a certain rate, those earning $150,000 are taxed at a slightly higher rate, and so on and so forth. Sometimes income tax rate reaches 90% and the individual has no incentive to provide more services. Progressive tax can be very beneficial in preventing induced demand. Of course, there has to be oversight to deter physicians from selecting easy cases and rejecting more complex ones” (M4).

**Theme 2: Factors related to the insurer**

Five factors related to the insurer were extracted from the interviews: limited role of insurance companies; insufficient monitoring of insurance companies; lack of development in private insurance and supplemental insurance; violation of insurance regulations and arrangements; and lack of development in evidence-based policymaking.

Insurers, as buyers of health services from hospitals, prevent induced demand to avoid incurring additional costs and respecting the rights of their insured by imposing restrictions. Limited role of insurance companies is another factor that is mentioned by the interviewees, for example: “The more developed insurance companies are and the stronger role they play, the easier it will be to control induced demand. In the US, for example, Medicare is very effective in controlling induced demand. Patients can’t go anywhere they like and be covered. Only hospitals that participate in Medicare provide covered services and, in other hospitals, patients have to pay out-of-pocket” (M4).

The interviews revealed that a lack of development in evidence-based policymaking is another important factor, for example, an interview said, “There should be more insurance regulations and arrangements to have an effect on induced demand. For example, there is a regulation in health insurance that MRI is covered once every 6 months, which wasn’t the case before. If insurance companies play a stronger role, work based on evidence, and learn from the past, they will be able to control induced demand” (M5).

Private insurance also has an effect on controlling the use of induced demand if develops well, but there is a lack of development in private insurance in our health system. A sample of comments made by the interviewee: “Our insurance companies aren’t effective and the services they provide to patients are decreasing. I believe that the system was better before the Health Transformation Plan was implemented. We need to redefine the insurance mechanism. We need to get the private sector involved” (M6).

**Theme 3: Factors related to the health-care provider**

Six factors related to the health-care provider were extracted from the interviews: interests of the healthcare provider; legal consequences (legal and medicolegal burden); requests without medical indications; transfer of services to the private and cooperative sectors; physicians’ employment contract with the hospital; and influence of pharmaceutical companies and medical device manufacturers. Some interviewees commented that interest and intensive of the health-care provider is one the most important factors leading to induced demand. Some interviewees commented that “The interests of healthcare providers are in patients receiving more and more services. In fact, they can create demand in the market for their services” (M6). Sometimes the incentives are not just financial. Another interviewee commented that “In some cases, physicians induce demand for their own interests, and these interests aren’t always financial in nature. For example, a physician tells a patient that he or she needs surgery, not just for money, but to gain experience, and sometimes they don’t even charge the patient” (M7). “Sometimes the interests of the physicians and their industry partners are on the line. The physician refers the patient to the laboratory for testing or consultation and the laboratory does the same for the physician” (M8).

Fear of legal consequences leads to induced demand. One interviewee commented that “People resort to all sorts of clinical and paraclinical services to avoid medicolegal consequences. They use these procedures to defend themselves in case of litigation” (M9).
Health-care provider has a role and it is one of the factors leading to induced demand because the provider and patient are not worry about payment and third party has this role. One interviewee commented that “Another issue is delegation. When a department is delegated, the physician or the person in charge must make money. Where does money come from? From more and more services … and that’s actually what the hospital wants. The managers ask that person to reach a certain level of revenue in, say, six months. They never investigate to see whether certain services have been necessary or not” (M10).

Pharmaceutical companies and medical device manufacturers can impact on induced demand. A sample of comments made by the interviewee: “The influence of pharmaceutical companies and medical device manufacturers could lead to adoption of medical approaches that, despite being very costly, aren’t very effective. These approaches increase demand for advanced technologies that have little to no effectiveness. In our country, there is not much oversight on technologies that are imported” (M12).

**Theme 4: Factors related to the health-care recipient**

Three factors related to the health-care recipient were extracted from the interviews: cultural issues and patients’ information gap; low deductible; and patients’ distrust of the country’s health system.

Low deductibles is a factor that is mentioned by the interviewees, for example, “When the cost of a doctor’s visit is equal to the cost of a bag of chips and insurance companies have no control over it, induced demand is inevitable” (M14); or another one said, “It is to some extent because of me and my worries. When something happens to me or I feel pain somewhere in my body, I immediately visit a doctor to make sure nothing’s wrong. Well, it doesn’t cost much to get a quick visit and check-up” (M15).

When patients’ distrust of the country’s health system and there is an information gap between patients and service provider and due to cultural issues, induced demand rises. An interviewee mentioned: “Induced demand in part originates from cultural issues and the information gap of the patients. For example, patients may distrust the physician or the system and try several clinics for diagnosis” (M13).

**Discussion and Conclusion**

The purpose of this research was to identify the factors in induced demand for health care in hospitals affiliated with IUMS. Factors identified from a set of interviews were divided into four main themes: the health system, the insurer, the health-care provider, and the health-care recipient. The Ministry of Health plays a key role in induced demand. Insufficient monitoring of the performance of physicians can prepare the ground for rise in induced demand. Specifically, medical indications are not examined correctly, and any oversight occurs after the physician issues the prescription and the patient receives the wrong service. For example, Keyvanara et al. argue that in Iran, physicians act both as overseers and as decision-makers, which leads to their interests taking precedence over patients’ interests.

Weak laws, ineffective implementation of health policies, and inadequate scientific capacity can also contribute to the rise in induced demand. One of the key barriers that complicates oversight is the lack of common medical protocols among physicians. Clinical guidelines are not used extensively in the country’s health system. Due to the lack of necessary laws and an appropriate structure, physicians are not obliged to comply with clinical guidelines.

The increase in burden of costs resulting from induced demand for unnecessary services reduces the budgets allocated for other health sectors, especially public health and prevention. Widespread use of imported drugs and equipment without medical indications also lead to foreign currency exchange losses. Increase in diagnosis and treatment costs is one of the most significant consequences of induced demand. Costs are most tangible in the paraclinical sector where unnecessary requests by physicians are prevalent. For example, Amporfu showed the impact of induced demand on the cost of care and patients’ welfare.

In addition, culture and advertising play an important role in the inducement of demand. The medicalization of the Iranian society has created an environment where everything is defined and treated as a medical condition. Advertising can slowly direct poorly informed patients toward unnecessary services. Increase in the number of physicians can also induce demand. The imbalance of supply and demand in the health-care market can encourage physicians to advertise and induce unnecessary services to maintain their position in this highly competitive environment. For example, Lien et al. list the number of competitors in the market as a supply-side factor in induced demand for healthcare.

Induced demand creates uncontrollable costs for patients and imposes unnecessary financial burden on insurance companies. Due to their limited resources, these companies cannot cover the costs arising from rising demands and, as a result, their debt to hospitals and other health centers is increasing. In some cases, debts force
Seyedin, et al.: Supplier-induced demand in health care

Studies have shown that one of the reasons argued that patients’ willingness to increase in the number of laboratory tests and recall visits, and increase in C-section delivery as influential factors.

Due to commercialization of treatment, patients are increasingly viewed as a commodity, which undermines the patient-centric approach to health care. The emergence of health-care markets has intensified competition between providers, resulting in their pursuit of financial interests to the detriment of patients’ interests. For example, Ferguson argued that a key factor in induced demand is the increased role of the market in provision of health care.

Information asymmetry between the physician and the patient can facilitate the inducement of demand. Physicians can exploit information gaps for financial gains. For example, Hansen et al. argued that physicians can convince patients that they need more care than necessary. Patients can also contribute to induced demand in several ways. The first reason is request for unnecessary care by patients themselves, especially insured patients, which results in ex post moral hazard. Braden and Lesur define moral hazard as health-care overconsumption due to health insurance coverage. Broomberg and Price showed an increase in unnecessary requests by patients as a result of insurance coverage. Sometimes, patients visit a physician with no specific cause, which could encourage the inducement of demand. On the other hand, some patients expect a long list of drugs in their prescriptions. For example, Mahbubi et al. showed that many patients make requests about the type and quantity of drugs. Bickerdyke et al. argued that rising expectations on the part of patients contribute to increases in the rate of usage of medical services.

Patients’ general lack of medical knowledge and their excessive trust in physicians may lead them to follow their instructions regardless of whether the recommended services are necessary or not. For example, Bickerdyke et al. argued that patients’ willingness to devolve decision making to physicians provides them the opportunity to induce demand for their services. Induced demand can lead to misallocation of resources, whereby resources are spent for patients that do not actually require care. This is also the case when all the costs of care are paid by the patient. Fabbri and Monfardini showed that induced demand affects the competitive allocation of services and resources.

Another factor that contributes to induced demand is the modernization of needs. Today, health-care needs are significantly different from the past given the patterns of diseases, patients’ living conditions, and technological advances. For example, Fabbri and Monfardini and Lien
et al. showed that epidemiological shifts, evolution of needs, demographic changes, and variation in tastes affect induced demand for health care.\textsuperscript{[21,34]}

One of the limitations of this study was the difficulty of engaging key informants for interviews. Through communications and continuous follow-up by the researchers and the attempts made to explain the significance of the study, this limitation was resolved to a great extent.

To conclude, the current study demonstrates that the supplier-induced demand is multifactorial in a health system. Therefore, addressing these factors identified in this study may result in decreased supplier-induced demand. To control supplier-induced demand, it is suggested that strategies such as examining patients’ real needs to refer to specialists, allocating sufficient time to examine patients, monitoring of physicians’ knowledge and their relationship with other health-related institutions, and investigating the process of diagnosing diseases should be used.

Overall, within the scope of this study and the composition of participants selected for interviews, the results can be generalized to all university hospitals and medical training centers for policymaking at the macrolevel. However, case studies are required to obtain a broader perspective into the issue of induced demand for health care using insights from experts in different fields and occupations involved in health.

Authors’ contribution
MA and HS designed research; MA and EH conducted research; MA, EH, AR, and PI extract data; and MA, HS, EH, AR, and PI wrote the paper. MA had primary responsibility for the final content. All the authors read and approved the final manuscript.

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Conflicts of interest
There are no conflicts of interest.

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