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Identification of the requirements for designing medical tourism information system of Iran

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Abstract:

BACKGROUND: Given the substantial role of information systems in planning and simplifying the decision-making process for the government, organizations, health centers, and facilitators, in order to attract medical tourists from less developed and neighboring countries, the comprehensive Iranian Medical Tourism Information System can be used. The objective of this study was to designing a conceptual model for Iranian medical tourism information system.

METHODOLOGY: This study was carried out in a three-step applied and combined method. In the first step, a systematic review was done on the studies and then the reliability of the results was checked during a semi-structured in-depth interview with 11 experts in medical tourism through open questions. In the third step, the Delphi method was conducted quantitatively to get the ideas of 26 experts. SPSS software version 22 was used for factor analysis.

RESULTS: The proposed conceptual model for Iranian Medical Tourism Information System includes a variety of services from the first moment of decision to travel until the moment of returning from a medical journey, following up the treatment, and sharing the patients' experiences.

CONCLUSION: It could be concluded that considering the commercial importance and financial benefits of medical tourism, it should provide the necessary facilities to expedite the provision of services to these foreign patients; consequently, an appropriate basis for attracting more medical tourists from neighboring countries, developing countries, and even developed countries will be provided.

Keywords:

Computer-aided design, information systems, management information systems, medical tourism

Introduction

Extensive changes in various industries, including land, air, and water transport, along with development in communications, including radio, television, satellite, telecommunication, Internet, and cell phone, have brought about suitable ground for providing and using worldwide health-care services, which has been all realized in the medical tourism industry.^[1]

Medical tourism has a short history in Iran, but in recent years, the availability

of qualified physicians and providing high-quality services in the treatment of infertility, dentistry, cardiac surgery, plastic surgery, ophthalmology, orthopedics, bone marrow transplantation, and liver transplantation has attracted a few number of medical tourists from less developed countries to Iran.^[2,3]

According to some studies, the cost of a foreign medical tourist in the destination country is four times higher than a regular tourist, and the attraction of this type of tourists should be considered as a kind of export and a source of exchange revenue.^[4-6] Therefore, considering the

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commercial importance and financial benefits of medical tourism, it should provide the necessary facilities to expedite the provision of services to these foreign patients; consequently, an appropriate basis for attracting more medical tourists from neighboring countries, developing countries, and even developed countries will be provided.

Based on the short-term and long-term plans, Iran's government was supposed to provide 30% of the country's health needs through goods exportation, medical services, and medical tourism until the end of the Fourth Development Plan, but it has not been yet realized.^[7] In 2004, Iran admitted approximately 12,000 foreign patients and in 2005, the trend reached 17,500, while it reached 30,000 in 2017 according to the Ministry of Health (MOH). On the other hand, medical tourism income has been increased from \$40 billion in 2004 to \$100 billion in 2012 worldwide; during the same period, Iran earned \$350 million, equivalent to <0.5% of the world's revenue.^[5,8,9] The total number of medical tourists in the world in 2017 is estimated to be between 14 and 16 million people, and the total value of the medical tourism turnover in the year is estimated at approximately \$439 billion.^[10] However, in recent years, reliable statistics of medical tourism income have not been reported for Iran.

The costs of treatment in Iran are lower than that in many advanced countries and even in the Middle East countries. On the other hand, the quality of health-care services in Iran is in a favorable status, and Iran is supposed to have a good position in the ranking of medical tourism attraction, but according to statistics of the World Tourism Organization, Iran ranked 41 in 2016 among different countries for attracting medical tourists.^[11]

Widespread access to information and communication technology and usage of the Internet by health-care providers and patients have an important role in having easy access to information on costs and health-care services worldwide. Currently, most of the competitive countries in the region have extensive medical tourism systems that facilitate many services, including the selection of hospitals and physicians and arrangement of medical travels and reservations for medical tourism packages; besides, they provide all services before treatment, during treatment, and even after treatment for tourists. However, in Iran, so far, no serious and practical steps have been taken by the government to develop a comprehensive medical tourism information system.^[12] However, an international patient registration system (<http://avab.behdasht.gov.ir/ipd>) has been established at the MOH to collect statistical information about medical tourists after referral to various health centers in Iran through

the offices located in hospitals entitled International Patient Department (IPD). The system has national application for the MOH and mostly has a statistical and data collection aspect and practically, tourists and facilitators do not have any access to this system and cannot use it.^[13] However, several facilitating companies in medical tourism services have independently created websites providing limited services to medical tourists in Iran, which are not enough according to the surveys and statistics mentioned above. Hence, the cycle of attracting tourism and supplying health-care services for tourists in Iran is not complete.

Therefore, due to the mentioned reasons and lack of enough information, many of these medical tourists and potential treatment clients in Iran prefer to go to neighboring countries including Turkey, Jordan, and even Southeast Asian countries such as India, Malaysia, Thailand, and Singapore.^[14] Thus, Iran will remain behind the competitor countries in the region and will lose a lot of economic benefits.^[15]

Hence, given the significant role of information systems in planning and simplifying the decision-making process for the state, organizations, and health-care centers of Iran that try to work in a competitive international environment, the existence of such information systems is vital; accordingly, the objective of this study was to investigate the requirements, components, and indicators of medical tourism information systems in other countries and provide a suitable model for Iran.

The study of Abubakar and Ilkan in 2016 examined the impact of online advertising on the selection of medical tourism destinations. The objective of their study was to investigate the impact of Electronic Word of Mouth advertising on selecting the tourism destination and the impact of income as a moderator variable. The results of their study suggested that, first, online advertising has a remarkable role in the development of medical tourism and promotes medical tourism. Second, it provides online and electronic services, and third, the level of tourists' income has an impact on choosing the destinations.^[16] In a study conducted by Hanefeld *et al.* investigating the role of networks in determining the medical tourism destination, the researchers analyzed the interviews of 77 medical tourists and 60 physicians, and then concluded that the decision to choose a destination for the treatment of medical tourists was divided into four steps. The first step was to decide on specific treatment; the second step was to decide on a trip abroad; the third step was to select the destination country; and finally, the fourth step was to select the service providers by communication networks. Communication networks always play a considerable role in these four steps.^[17]

A research by Turner in 2011 aiming to analyze the content of Canadian medical tourism's transnational websites revealed that Canadian websites offer valuable information on countries, medical centers, and residential places; so by this way, they established their position in the national and transnational competition market.^[18]

The study of Crooks *et al.* on the promotion of Indian medical tourism suggested that success in medical tourism depends on the success of informing patients about treatment procedures, treatment facilities, tourism opportunities, providing travel services, and facilitating the issuance of visas to destination countries. Besides, the promotion of medical tourism involved a wide range of marketing tools such as advertisement, websites, and information systems.^[19]

Methodology

The study was conducted in an applied method, and it was a three-step combined study. Data collection and systematic review were carried out qualitatively. Then, the experts' co-thinking technique was used; and in the third step, after designing the conceptual model, the validity of proposed conceptual model was examined quantitatively.

In the first step, a systematic review was carried out on previous studies on the characteristics and structure of medical tourism information systems, and the databases which were used included Web of Science, PubMed, Embase, Ovid, Scopus, Google Scholar, SID, and ISC. The most widely used keywords in this field were medical tourism, medical care abroad, medical tourism website, medical tourism facilitator, treatment abroad, medical tourism portal, and international travel care.

In the second step, which was a semi-structured interview with open questions, the findings of the first step were discussed to be agreed upon; besides, the reliability of proposed minimum data set was assessed by 11 medical tourism experts.

The third step consisted of two steps. In the first step, based on interviews with the research population, the conceptual model of procedures, roles, duties, and components of the system were identified and determined. In the next step, using a questionnaire and closed questions, the validity of the proposed conceptual model was examined quantitatively through Delphi method. In this step, 26 individuals from health tourism experts, health informatics, and health information management formed the statistical population, and those who had participated in the interview phase were excluded from this step.

The informed consent forms were filled out by the people who participated in the interview. In the third step, the statistical population was informed that filling out the questionnaire indicated their satisfaction regarding the participation in the study; and they were assured that their opinions would be confidential. The Statistical Package for Social Sciences (SPSS) software (IBM corporation; version 19) was used for statistical analysis of the principal component analysis with promax rotation and unrestricted number of factors for our factor analysis.

Results

Out of 163 articles searched in the first step of the study, after removing the duplicates and considering the inclusion and exclusion criteria, at last 15 articles were used, which had the most relevant issues on the requirements, components, and structure of medical tourism information systems.

In the second step, 11 medical tourism experts from Iran were recruited, including three from the MOH; one from the Ministry of Foreign Affairs; two from the Iranian Cultural Heritage, Handicrafts and Tourism Organization; two managers from medical tourism facilitator companies; one from Iranian medical tourism association; and one faculty member, a user, and an official member from the IPD at hospitals working in the field of medical tourism. They were all interviewed. Given the studies carried out in the first step, the requirements and components of the medical tourism information system were identified and determined.

The results of the surveys suggested that the content of services and information at the first level consisted of five general categories; at the second level, it had 14 groups; and at the third level, it entailed 62 subcategories, all of which are specified in Figure 1.

Introducing hospitals' and facilitators' company

This category covers a variety of services and information on medical options in Iran; based on the findings, the maximum frequency of services and information is related to this category. This shows that senior managers of the system need to emphasize this category of services and information. The main content of this category is the information that helps the patient to plan for his/her medical travel in the optimal time by evaluating and reviewing the information of therapies and medical tourism destinations; considering his/her treatment and by comparing the services of health-care providers, the best destination and health-care provider are chosen, and he/she obtains the full knowledge about the services before and after treatment.

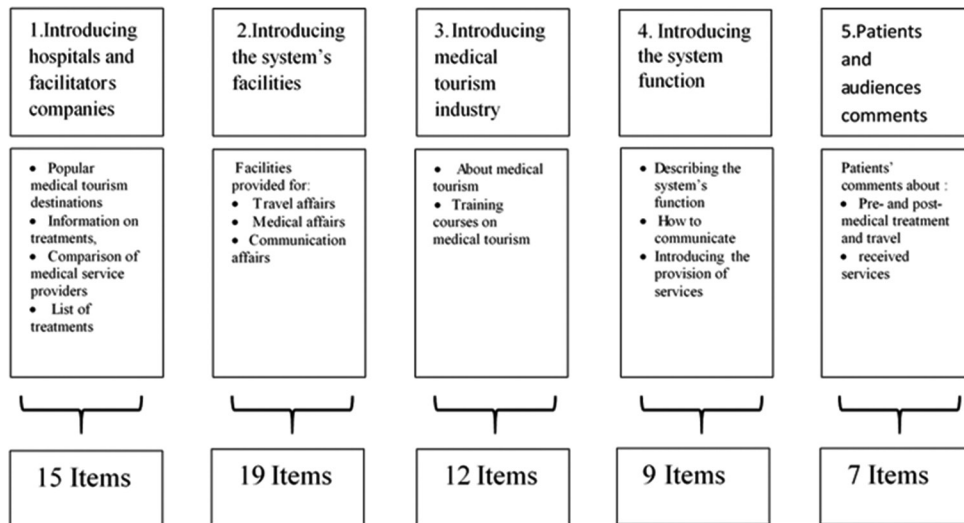


Figure 1: Essential factors for Medical Tourism Information System

Information about medical choices is divided into four groups of popular medical tourism destinations, information on treatments, comparison of medical service providers, and the list of treatments.

The first group is about popular medical tourism destinations that provide information about the cost of treatment(s), a summary of treatment(s) method, health system descriptions, the reason for choosing the foreign country, and information about the destination country.

The second group includes information about treatments; information on how to transfer medical records; setting medical appointments; and applicable information about, before, and after the surgery.

The third group is about comparing the health-care providers, which includes the comparison of treatment in different countries; comparison of medical centers, hospitals, and clinics; and comparison of résumés and qualifications of physicians and surgeons. This information provides the patient the right choice and also recalls the points needed to select each choice.

And, last but not the least is the list of treatments, which includes choosing the treatment type and choosing the treatment field.

Introducing the system's facilities

The second category with the highest frequency of content in the table is the available content about introducing the system's facilities. The type of facilities provided on a medical travel is one of the most important requirements for planning a medical travel. The main contents of this category are the facilities provided for travel affairs, medical affairs, and communication affairs,

which all affect the decision and selection of medical tourists.

The first content is travel facilities, which entails medical travel insurance services, facilitating the process of getting visas and passports, providing international payment services, providing translation and interpreting services, providing accommodation services in the destination country, introducing medical travel agencies as facilitators and providing their characteristics, introducing tourist attractions in destination country, and giving a destination map that provides a variety of services and the provision of land and air transport.

The second content of medical facilities includes vaccination and health services in the destination country, providing convalescent care facilities, providing support services when returning to the country of origin, providing air ambulance services, and providing free phone calls with the specialist to answer questions.

The last content is communication facilities, which consists of providing a cell phone abroad, providing an international SIM card, and providing telecommunications software.

Introducing medical tourism industry

This category provides reliable information about all aspects of the medical tourism industry to the patient and increases the patient's awareness of the decision to travel for the desired treatment. The content in this category is divided into two groups: about medical tourism and training courses on medical tourism. Each subcategory includes some information as follows:

The first group of contents is about medical tourism, which includes the definition and history of medical

tourism; economic costs in medical tourism; step-by-step explanation on medical travel; the quality and safety of treatment abroad; the Statement of Patient Rights and Code of Ethics in medical tourism; about the logo and membership in the Joint Commission International; and advertisement about physicians, health-care centers, and popular therapies in the country.

The content of the second group is information about training courses and meetings in the field of medical tourism, which includes congresses and conferences of medical tourism, medical tourism events, medical tourism workshops, and links to blogs and news websites.

Introducing the system

The purpose of this content is to introduce the system's function as a trusted system for Iran's government; in fact, the main objective is to convince the audience in terms of providing the medical tourists with security and reasonable services. The information assures the medical tourist that, by choosing this system, he/she will have a safe, cost-effective, and centralized travel; all the services can be observed, and the patient can make a better decision in choosing the hospital and the facilitator. The main content of this category includes the following three groups: describing the system's function, describing how to communicate, and introducing the members and related organizations in the provision of services.

The first group is describing the system's function, which includes the system's objectives; mission and vision of the system; the reason for choosing the present system; commitment, warranty, and patient safety; creating value for the patient in the destination country; and date of the last update of the system's website.

The second is how to communicate, which involves applying for membership in the system; communicating through social networks, phone numbers, and E-mail address; and describing how to contact health centers and offices of facilitating companies in the destination country and other countries.

The last is about introducing the members, which comprises board of directors, advisory board members, partners, and other governmental and nongovernmental organizations involved in this process.

Patients' and audiences' comments

This content is to get acquainted with the views of previous patients and audiences and making sure of the right decision. In this category, the views of patients and the audiences are divided into two groups as follows: comments about pre- and post-medical treatment and travel and patients' comments about received services.

The first group, which is comments about pre- and post-treatment and medical travel, includes written comments, video comments, and audio comments.

The second group, which is patients' comments about received services, includes comments on various types of treatment(s), treatment price(s), medical centers, hospitals, and clinics, as well as the comments on comparison to other countries providing treatment(s).

According to the above-mentioned findings, at this stage, it was necessary to examine the correlation between the components found in the previous steps. We used SPSS software (IBM corporation; version 19) and the principal component analysis with promax rotation and unrestricted number of factors for our factor analysis. We used promax as we expect the factors are correlated [Table 1]. The sample size was 32 respondents. We keep all factors with Eigenvalues above 1 (Kaiser's criterion). The factor analysis shows five factors with Eigenvalues of 1 or higher and explains 62.24% of the variance in the data.

Discussion

The proposed content in this study is based on the importance and priority of services and information. Their repetition and importance at the first level is more than at the next levels, and priority and ranking of information and services are based on their frequency. By studying current medical tourism and medical systems, researchers have concluded that medical tourists needed lots of medical information and services that medical tourism systems were trying to meet these needs. In fact, in this research, it has been tried to enrich the proposed model by the Iranian Medical Tourism Information System with useful information from the first moment of decision to travel until the last moment of return from the medical travel, as well as information on sharing experiences of patients and users. These services and information are provided at three levels and five general categories for medical tourists. The results of the experts' meeting indicated that, in the top medical tourism systems, introducing the medical choices was more important than any other content, and the level of importance of other contents is shown in the following order: introducing the system's facilities, the medical tourism, the system, and the comments of patients and audiences.

Table 1: Component correlation matrix

Component	1	2	3	4	5
1	1				
2	0.381	1			
3	0.621	0.618	1		
4	0.668	0.541	0.637	1	
5	0.578	0.632	0.589	0.688	1

Extraction method: Principal component analysis j rotation method: Promax with Kaiser normalization

Turner (2012) in the study of assessing the systems of Canadian medical tourism companies concluded that such systems provided valuable information about the countries, medical centers, accommodation, and hotels;^[18] besides, the results of his study were consistent with the findings of the present study. Cormany and Baloglu, in 2011, reviewed the systems of medical tourism facilitators whose names were listed in the tourism guidebooks; they concluded that such systems contained services and information, including E-mail address, choosing the hospital, comments of previous tourists, and staying in the hotel,^[20] which were consistent with the findings of the present study. Another study, relatively similar to the present research, was Wagle's research in 2013, which was a study on web-based facilitators in the field of medical tourism; he suggested that low costs of medical travel in destination country were considered as a major attraction on medical tourism websites.^[21] This component was also presented in the present study as one of the most significant components of information. Therefore, for a comprehensive study with no geographic constraints and without any distinction between the websites of hospitals, facilitators, and medical tourism systems, by identifying the components and contents of the websites of hospitals and facilitators, the researchers have tried to elaborate the services and information provided by the world's leading medical tourism systems at various levels.

Conclusion

By creating a tourism information system, not only the hospital is selected considering the characteristics of each specialized medical center, but also by taking into account the patient's condition and problems and transmission of his/her medical records, necessary coordination will be carried out. This leads to collecting, processing, and saving necessary information of the patients through the system from the beginning; moreover, information of these patients is distributed up-to-date and centralized, among different levels of the managers of health centers, including middle-level managers and top-level managers of the medical centers and top-level managers in the MOH and other governmental agencies and organizations that need this information to make big decisions.

Because medical tourism is one of the widest and most profitable branches of tourism worldwide, it is suggested to design a multilingual system in this field by introducing the services and contents proposed in this study. Regarding the results of the present survey and the contents presented to the managers of medical tourism websites and medical tourism activists, it is suggested to use the components of this research for attracting medical tourists; besides, in order to design

the logical and physical models of the national medical tourism system, medical tourism organizations are expected to use the results of this study.

Moreover, considering the fact that academic findings are still relatively limited in this realm, it is suggested to conduct further studies for more comprehensive investigations to design Iranian medical tourism information system.

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Conflicts of interest

There are no conflicts of interest.

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