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Assessment of private hospital portals: A conceptual model

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ABSTRACT

Introduction: Hospital portals, as the first virtual entry, play an important role in connecting people with hospital and also presenting hospital virtual services. The main purpose of this article was to suggest a conceptual model to improve Tehran private hospital portals. The suggested model can be used by all the health portals that are in the same circumstances and all the health portals which are in progress.

Method: This is a practical research, using evaluative survey research method. Research population includes all the private hospital portals in Tehran, 34 portals, and ten top international hospital portals. Data gathering tool used in this research was a researcher-made checklist including 14 criteria and 77 sub-criteria with their weight score. In fact, objective observation with the mentioned checklist was used to gather information. Descriptive statistics were used to analyze the data and tables and graphs were used to present the organized data. Also, data were analyzed using independent t-test. Conceptual modeling technique was used to design the model and demonstration method was used to evaluate the proposed model. In this regard, SPSS statistical software was used to perform the tests.

Results: The comparative study between the two groups of portals, TPH and WTH, in the 14 main criteria showed that the value of t-test in contact information criteria was 0.862, portal page specification was -1.378, page design criteria -1.527, updating pages -0.322, general information and access roads -3.161, public services -7.302, patient services -4.154, patient data -8.703, research and education -9.155, public relationship -3.009, page technical specifications -4.726, telemedicine -7.488, pharmaceutical services -6.183, and financial services -2.782. Finally, the findings demonstrated that Tehran private hospital portals in criterion of contact information were favorable; page design criteria were relatively favorable; page technical specifications, portal page specification, public relationship, patient data, general information and access roads, and financial services were inappropriate. Also, patient services, updating pages, public services, pharmaceutical services, research and education, and telemedicine were in a poor condition.

Conclusion: Results of this study suggests that an appropriate model should contain 2 levels with 4 layers.

Keywords: Private hospitals, Portals, Gap analysis, Conceptual model, Tehran city

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Introduction

Various tools are currently used to disseminate health information. In fact, the use of these tools depends on patients' needs, hospital service providers, those who receive the services and medical centers. The applied tools vary from preparing brochures to newest technologies, especially Information and Communication Technologies (ICT) in order to prepare immediate services. Providing these kinds of services depends on offering the above mentioned items, budget, technical facilities, and so on. Nowadays, a variety of technologies, particularly ICT technologies, have led us to use them instead of other previous technologies. These technologies have several advantages in comparison to the old ones in terms of their low performance cost, ease of use, most popularity especially in the current decade, information transfer speed and their process, personalization features, portability and transferring high volumes of data in little space, lack of dependence on time and space limits, and so on.

Nowadays, ICT technologies have found high variability, such as web sites, online databases, weblogs, pad castes, portals, RSSs , etc. Organized view to these technologies in order to categorize them has led us to classify them in two categories: technologies associated with web and those associated with web 2.0. Web portals use capabilities of either web 1.0 or web 2.0 technologies (1, 2).

Web portals are information gateways for their users. Portals originally gather information and services from distributed sources and provide them to users all at one place. This helps the users to get integrated access to their needed information and services around the activity of the portal. Portals, unlike websites, are connected to different databases and sources, exchanging information permanently with them and providing classified data and

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services (3). Of course, this does not mean that they do not release any information, but also portals have the ability to disseminate their own information. Even they have the ability to share their information and services with other portals and systems.

Addressing the web usability as an important indicator of exchange and providing access to information especially in healthcare domain is essential. Lack of a structural-content standard portal model has caused many problems and defects in making users' access to portal information and services, especially in health domain. A glance at the hospital portals, especially in Iran, showed that there is a chaos in disseminating information and services (a brief study conducted by researchers, 2014). In fact, some of the active private hospitals in Tehran city have no independent portal and many others have inappropriate portals that do not have updated and useful information for referrals. This indicates that responsible officials do not care about this important subject, i.e. preparing a sufficient portal. Since private hospital portals try to increase their revenue, so it seems that these organizations should pay more attention to their connections with their customers and services. In this regard, portals of the private hospitals, as pioneers, were selected to be evaluated. Thus the main purpose of this study was to propose a structural and content model for private hospitals located in Tehran city. This will help us to prepare a guide in order to improve the quality of private hospital portals. Basic assumption of this study is the poor quality of private hospitals located in Tehran city (based on the researcher's observations and the published literature in this field in Iran) (4, 5). The findings can also help us to identify the strengths and weaknesses of the Tehran private hospital portals. It is obvious that findings provide necessary fields to promote the portals.

According to the above-mentioned point, firstly 10 top ranked international hospital portals were studied and also the current situation of Tehran private hospital portals was studied from the perspective of structural and content domain. Afterwards, a structural and content model for Tehran private hospitals was designed using gap analysis and design techniques.

The study of the retrieved resources in hospital portals showed that 23 related researches had been done in the field of portals. In fact, the first research in this field was conducted I the year 2000 (6).

Review of the researches demonstrated that most studies on portals have were in 2002 (7-11). This shows that from this year onwards, portals and their services have been more considered. Also, most of the researches emphasize the website assessment in travel and transportation (12), banks and accounting firms (13-15), hotels (16), educational settings (10), libraries (17), governments (5, 9, 18-20) and hospitals (3, 4, 6, 7, 21-24). In some cases, researches were comparative studies on the related websites. Moreover, some of them were related to portals and especially hospital portals, such as Lee, Goh, Chua (2007, 2010).

According to the importance of portals in information provision and dissemination to hospital customers and their role in enhancement of customer satisfaction and increase in the efficiency of hospitals in providing valuable services to the public, it is essential to do some researches on the use of portals and their performance. Therefore, quality assessment of services, content and platform in hospital portals help the hospitals and health centers to improve their services especially in the virtual world. In addition, this helps us to create positive competition between hospitals, especially private hospitals , in order to improve their services. Therefore, this study attempted to identify the current status of Tehran private hospitals and world's top portals; also, using gap analysis we proposed a conceptual model for hospital portals to enhance their online services. It is obvious that lack of sufficient information on this case and lack of knowledge about the gap and also the strengths and weaknesses cause problems in decision making and providing proper services to customers. Therefore, it is important to have some information in evaluating the quality of portal services in these organizations. Accordingly, the present study was an attempt to answer the following questions:

1. What is the situation of portals of private hospitals in Tehran in comparison with the world's top portals?
2. What is the sufficient conceptual model of enhancing hospital portals?

Methods

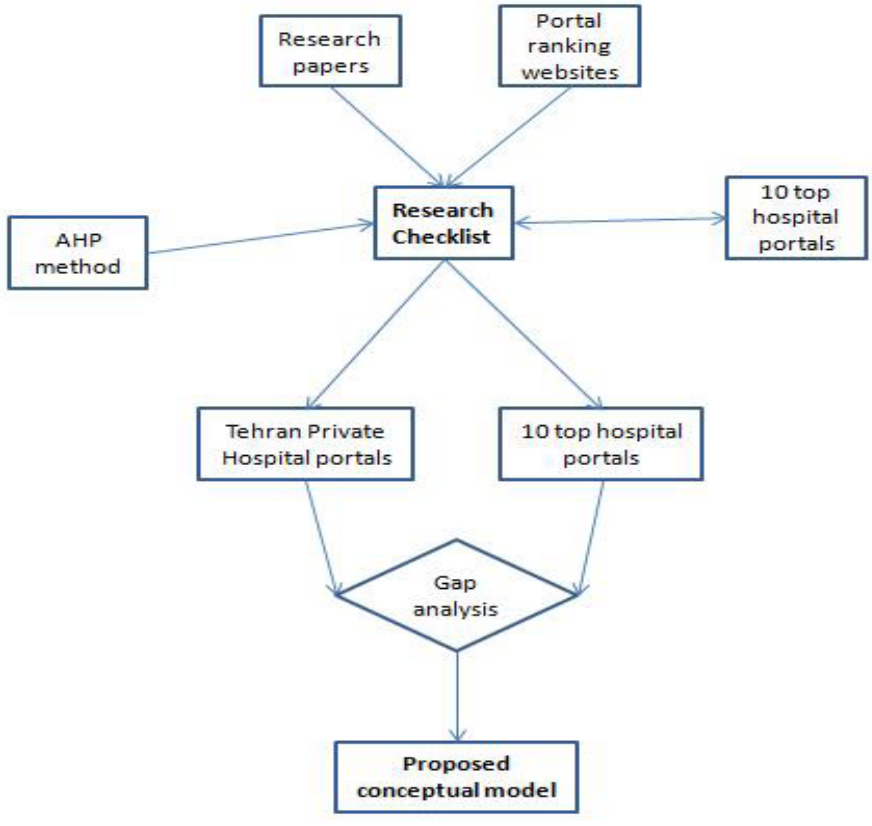
In this study, we first prepared a checklist to assess the hospital portals. In order to do this, related studies (such as (3, 7, 8, 25-28)) and portal ranking websites (such as Ranking web of hospitals , Best hospitals , Etc.) were studied (Figure 1). Consequently, the first version of the checklist was provided by studying the above-mentioned sources and then sent to five specialists in the field of portal and website usability. Then, the suggestions were monitored and added to the checklist. Hereafter, ten top hospital portals were studied by the checklist to ensure its suitability. As a result some modifications were done in the checklist out according to prepared items and services in the portals. Consequently, the new version of the checklist was prepared by 14 main criteria and 77 sub-criteria.

Following this, in order to weigh the main and sub-criteria in the checklist, AHP method was used. In this way, the main and sub-criteria were entered into Excel computer program and a two dimensional vector was separately created with the main and sub-criteria. The files were sent to three specialists so as to weigh the items in comparison with each other. Then, the received back files were merged and normalized. The result was sent back to the specialists and their final confirmation was received. Consequently, the final version of the checklist was prepared.

The next step was data gathering. In order to do this, firstly Tehran private hospitals' list was tried to be identified. Unfortunately, there was no comprehensive list of private hospitals. Thus, the related lists were gathered and integrated. Also, researchers added some other items, especially new hospital constructions. Then, all the hospitals in the list were contacted in order to ensure that the list is complete. Following this, all the items in the list were searched and their portal addresses were added to the list. Finally, 58 private hospitals were identified, of

which just 34 had portals. On the other hand, the website "Ranking web of hospitals" was surveyed in order to identify the 10 top ranked world hospital portals. In this way some of the cases not in the English language were omitted from the list and the next one replaced.

Figure 1. Research process



The next step was data gathering. In fact, the researchers studied the above mentioned portals by the checklist and filled the items. Findings were entered into Excel and SPSS computer programs and t-test was used to identify the gap between TPH and WTH portals, and the tables and graphs were built by Excel style sheet program. Also, the percentage, mean and so on were used to analyze the data. Moreover, Likert scale was used in some questions in order to measure between two lower and upper limits. In fact according to Likert scale, In this study, the scores under 25% were considered as the weak mode, the scores between 26-50% as inappropriate mode, the scores between 51-75% as relatively desirable, and the scores more than 76% as desirable.

Also, to analyze the data independent t-test was used through SPSS statistical software.

Then, gap analysis was applied to address the distance between the above two mentioned groups of portals. The final step was about conceptual modeling in order to improve the current situation of portals to achieve good rank in service delivery. It is important to mention that in order to generalize the model there is a need to examine it in other cases. In this regard, the proposed model can be used by health and hospital portals planning to enhance their portal services.

Results

The study of the current situation of the world 10 top portals (WTH) and Tehran private hospital (TPH) portals helps us to show their present status in comparison with each other. Consequently, the study of the distances shows us the way to promote the status of TPH portals. Finally, the conceptual model was proposed. Therefore, the status of the two mentioned groups is expressed as follows.

Comparative study in the contact information criteria showed that the two mentioned groups of portals (TPH and WTH) in this main criterion and its sub-criteria are close to each other. Also, T-test results showed that the T-value was 0.862 and P-value was 0.414. Given that the number of the P-value is greater than 0.05, it can be concluded that there is a significant difference between the two groups.

Findings also demonstrate that the status of TPH portals in terms of the features of portal pages criteria is not suitable. Their score was below the mean (39%). In fact, a sub-criterion of access to webpage for the disabled is an item about which the TPH portals do not care enough. On the other hand, WTH portals are not in good condition in terms of the link to the related websites. Also, T-test results showed that the T-value was -1.378 and P-value was 0.217. Given that the number of the P-value is greater than 0.05, it can be concluded that there is a significant difference between the two groups.

As shown in Table 1, the status of TPH portals in the field of webpage design is in a relatively desirable level (72%) and their distance with WTH portals (96%) is reasonable. as Also, T-test results showed that the T-value was -1.527 and P-value was 0.165. Given that the number of the P-value is greater than 0.05, it can be concluded that there is a significant difference between the two groups.

Table 1. Status of hospital portals in contact information, features of portal pages, webpage design, updating pages, public information access ways and public services main criteria

Criteria	Sub criteria	TPH		Criteria %	WTH		Criteria %
		No.	%		No.	%	96
Contact information	Hospital name on the top	34	100	90	10	100	
	Hospital logo on the top	33	97		10	100	
	Contact info: hospital address	31	91		10	100	
	Contact info: phone, fax	32	94		10	100	
	Contact info: email	23	68		8	80	
Features of portal pages	Site map	12	35	39	10	100	70
	Site search engine	17	50		10	100	
	Access to webpage to disables	1	3		5	50	
	Link to related websites: hospitals, associations, organizations, etc.	23	68		3	30	
Webpage design	Show images that make beautiful page design	25	74	72	10	100	96
	Explanations that activated while clicking on	4	12		8	80	
	Font types that facilitate the readability of text	31	91		10	100	
	Font size that facilitate the readability of text	32	94		10	100	
	Font color that facilitate the readability of text	30	98		10	100	
Updating pages	Page creation date	6	18	18	0	0	27
	Date of the last updates	1	3		0	0	
	Webpage that updated in the last 2 months	11	32		8	80	
Public information, access ways	Message: welcome to the hospital	8	24	28	3	30	73
	Hospital history	18	53		10	100	
	Hospital location	18	53		10	100	
	Area that hospital cover it	2	6		6	60	
	How to reach the hospital	2	6		9	90	
	Hospital virtual visit	9	26		6	60	
Public services	Portal registration	0	0	17	10	100	84
	Presenting content in English	13	38		10	100	
	Mobile version	0	0		6	60	
	Departments guide in floors	21	62		8	80	
	Service guide: Name and location of employees	24	71		5	50	
	Service guide: phone, fax	5	15		10	100	
	Service guide: email address	0	0		10	100	
	Organizational chart	6	18		2	20	
	List of services that hospitals provide	6	18		9	90	
	Access to Hospital Annual Report	0	0		9	90	
	Supplementary services: press, cafeteria, TV, etc.	2	6		8	80	
	Receipt of public assistance	0	0		10	100	
	Online admission	5	15		10	100	
	Social networks	0	0		10	100	
	Payment Services	0	0		10	100	
	Insurance Services	25	74		9	90	

Review of the table demonstrates that the two studied groups of portals in the field of updating pages are in an inappropriate mode. Despite this, TPH portals have obtained lower score. Also, T-test results showed that the T-value was -0.322 with a P-value of 0.764. Given that the number of the P-value is greater than 0.05, it can be concluded that there is a significant difference between the two groups.

Moreover, findings in the field of public information and access ways indicated that the distance between the two studied groups of portals was relatively high (45%). This indicates that TPH portals do not pay enough attention to the items in this criterion. However, WTH portals do not present good effects in sub-criteria of virtual visit and hospitals' coverage area. Also, TPH portals are weak in the hospital coverage area and sub-criteria for reaching the hospital.

Moreover, T-test results showed that the T-value was -3.161 and P-value was 0.01. Given that the number of the P-value is under the 0.05, it can be concluded that there is no significant difference between the two groups.

Moreover, Table 1 shows that the public services criterion in TPH portals is in a weak mode (17%). In fact, portal registration, mobile version, and social network sub-criteria are the items to which no attention is paid in TPH portals.

In addition, as T-test results showed the T-value was -7.302 and P-value was zero. Given that the number of the P-value is under 0.05, it can be concluded that there is no significant difference between the two groups and the two groups are in the swing mode. But the mean difference shows that the two groups are far from each other.

Table 2. Status of hospital portals in patient services, patient's information needs, research and education, public relationships, technical specifications of pages, telemedicine, drug services and financial services

Criteria	Sub-criteria	TPH		Criteria %	WTH		Criteria %
patient services	The patient care unit: location	14	41	18	9	90	65
	The patient care unit: working hours	7	21		8	80	
	The patient care unit: phone, fax	5	15		10	100	
	Feedback form available via the Internet or e-mail	9	26		3	30	
	Rating form available via the Internet	14	41		5	50	
	Request Form available via the Internet	1	3		9	90	
	Information about patients' rights and obligations	7	21		10	100	
	Hospital strategic Plan: strategies and actions to achieve the proposed goals	10	29		5	50	
	Information about ISO and EFQM assessments	0	0		2	20	
	Commitment to quality patient care	1	3		9	90	
	Presents the results of patient satisfaction surveys	1	3		1	10	
Patient's information needs	Hospital guidelines: information and regulations during the patient's hospital stay	15	44	35	7	70	70
	Hospital guidelines: information and regulations throughout the hospital	11	32		8	80	
	Hospital guidelines: information and regulations when leaving hospital	8	24		7	70	
	Hospital guidelines: information and related regulations for visitors	13	38		7	70	
	Essential information for visiting the outpatient consultation: hours, phone, etc.	12	35		6	60	
	Program of refer to the outpatient counseling via the Internet or e-mail	16	47		7	70	
	Important information for emergency department: Phone, etc.	8	24		7	70	
Research and education	Research: studies sponsored or conducted by the hospital	4	12	11	10	100	83
	Library: Address	2	6		7	70	
	Library: work hours	0	0		7	70	
	Library: resources	1	3		7	70	
	Library: services	0	0		7	70	
	Inform national and international medical news	5	15		10	100	
	Health information	13	38		10	100	
Public relationship	Hospital news	25	74	38	10	100	100
	Hospital publications	1	3		10	100	
	Hospital Careers	13	38		10	100	
Technical specifications of pages	All links in pages	15	44	41	10	100	100
	Links that are directed to specific files	11	32		10	100	
	Page Download Time Less than 10 seconds	25	74		10	100	
	Pages can be printed without problems	5	15		10	100	
Telemedicine	Clinical Care	0	0	7	7	70	75
	Consulting Services	5	15		8	80	
Drug services	Pharmacy Information	9	26	13	10	100	90
	Connect with pharmacy	4	12		10	100	
	Drug Information	0	0		7	70	
Financial services	Cost of services	2	6	26	9	90	93

The data in the field of patient services in Table 2 shows that the standard of services delivered to patients in TPH portals is in a weak condition. However, WTH portals are in a relatively desirable condition. Moreover, information about assessment sub-criteria in both portals studied is in a chaos situation. Moreover, T-test results showed that the T-value was -4.154 with a P-value of zero. Given that the number of the P-value is under 0.05, it can be concluded that there is no significant difference between the two studied groups.

Findings presented in Table 2 in the field of patient's information needs demonstrate that TPH portals got half the score of WTH portals. Therefore, we can say that TPH portals are in an inappropriate mode compared to WTH portals that are in a relatively desirable mode. Moreover, T-test results showed that the T-value was -8.703 with a P-value of zero. Given that the number of the P-value is under the 0.05, it can be concluded that there is no significant difference between the two groups.

Data in Table 2 shows that research and education criterion in TPH portals is in a weak mode, while WTH portals are in a desirable mode. Thus, there is a large gap between the two sets of portals. Some of the sub-criteria such as library work hours and services have not been considered in TPH portals. Also, T-test results showed that the T-value was -9.155 with a P-value of zero. Given that the number of the P-value is under the 0.05, it can be concluded that there is no significant difference between the two groups. Accordingly, the mean difference shows that the two groups have large distance with each other.

The above table shows that the WTH portals are in a desirable mode compared to TPH portals that are in an inappropriate mode in terms of public relationship criterion. Also, this shows that there is a large gap between the two studied portal groups. Moreover, T-test results showed that the T-value was -3.009 and P-value was 0.095. Given that the number of the P-value is greater than 0.05, it can be concluded that there is a significant difference between the two groups.

Also, findings in technical specifications of pages indicate that TPH portals are in an inappropriate mode compared to WTH portals that are in a desirable mode. Also, T-test results showed that the T-value was -4.726 with a P-value of 0.003. Given that the number of the P-value is under the 0.05, it can be concluded that there is no significant difference between the two groups.

Findings as to telemedicine criterion presented in Table 2 demonstrate that TPH portals are in a weak mode. In fact, due to the need to the use of new technologies, especially information and communication technologies in medical and health domain, it is important to pay special attention to telemedicine and other technological aspects in order to improve their portal services. Also, T-test results showed that the T-value was -7.488 with a P-value of 0.017. Given that the number of the P-value is under the 0.05, it can be concluded that there is no significant difference between the two groups.

Findings in terms of drug services criterion show that TPH portals are in a weak mode compared to WTH portals that are in a desirable mode. In fact, this demonstrates that WTH portals have paid sufficient attention to the drug services criteria. Therefore, it is necessary to pay special attention to this criterion with regard to its individual components so that the TPH portals are improved. Moreover, T-test results showed that the T-value was -6.183 and P-value was 0.003. Given that the number of the P-value is under the 0.05, it can be concluded that there is no significant difference between the two groups.

Finally, the findings in the financial services criterion show that TPH portals are in an inappropriate mode. The large gap between the two studied groups demonstrates that TPH portals do not care about this criterion. as Also, T-test results showed that the T-value was -2.782 and P-value was 0.104. Given that the number of the P-value is greater than 0.05, it can be concluded that there is a significant difference between the two groups.

Discussion: Proposed conceptual model

The study of the current situation of the private hospital portals and their comparison with the ten top World Hospital Portals showed us the gap between them in the studied criteria in response to the first main question of this research. The mentioned gap is clearly demonstrated in Figure 2.

Figure 2 is designed based on the percentage of the scores acquired by the two studied group of portals, TPH and WTH. A look at the figure shows that there is a large gap between them. In fact, TPH portals in 6 criteria are in a weak mode; in the other 6 criteria they are in an inappropriate mode, and just in one criterion they are in a relatively desirable and desirable mode. This finding is in line with those of researches in governmental websites (19, 20), library domain (17) and Iranian hospital portal ranking (24). This comparison shows that the situation in other domains is the same in hospitals. So we need to take measures to improve the portals in all the domains.

On the other hand, WTH portals in just one criterion are in an inappropriate mode; in 5 criteria they are in relatively desirable mode and in 8 criteria in a desirable mode. This finding shows that WTH portals, despite being in good situation, need to improve their ability in updating the pages' main criterion. On the other hand, their attention to other criteria is worthwhile. These findings are similar to those of other studies in hospital domain such as the studies conducted by Shepherd, Zitner, Watters (6), McCord, Frederiksen, Campbell (7), Grossman, Bodenheimer, McKenzie (4), Lee, Goh, Chua (3, 22), Llinas, Rodriguez-Inesta, Mira, Lorenzo, Aibar (23). It is important to have in mind that in this study we selected the top ten hospital portals and the diversity in some criteria can be considered reasonable. Consequently, we see a large gap between them and there is a need to plan in order to cover the gap.

Then, we tried to propose a conceptual model according to the findings and present the gap between the two studied groups of portals in order to improve the situation of TPH portals. Therefore, the model is based on the findings of this study and tries to design the favorable condition based on it. Also, the proposed model is based on the criteria and sub-criteria that are the basis of this research. Moreover, the move from the current situation to a favorable one needs to consider the progress of ICT technologies and more importantly be in line with their growth.

Results of this study and similar ones in the portal domain and their role in getting access to information indicate that the portal is a sufficient channel to get integrated access to the user's information need. So, the user with one single sign on (SSO) can use all the subsystems in an organization such as hospitals. Accordingly, the following comprehensive model represents the role of integrated access to the required information by hospital portals.

information and use services demonstrate that telemedicine, pharmacy, finance, digital library, research and education, health information and laboratory services are important systems and getting access and using them are too important.

Findings in the hospital sub-systems so as to get In fact, their information and service feeding have been done by different ways and methods. As shown in Figure 3, these facilities and services are provided by hospital portals. Users of hospital portals are classified into the following four categories: Patients and those who need hospital information, users who are responsible for entering the data, hospital system managers, and portal senior manager. All the systems use a data repository that includes all the information fields and capabilities required by the existing systems. The data repository should have the ability to support all the sub-systems by using information management standards, interoperability and automatic backup systems.

Figure 2. Comparative results of TPH and WTH portals

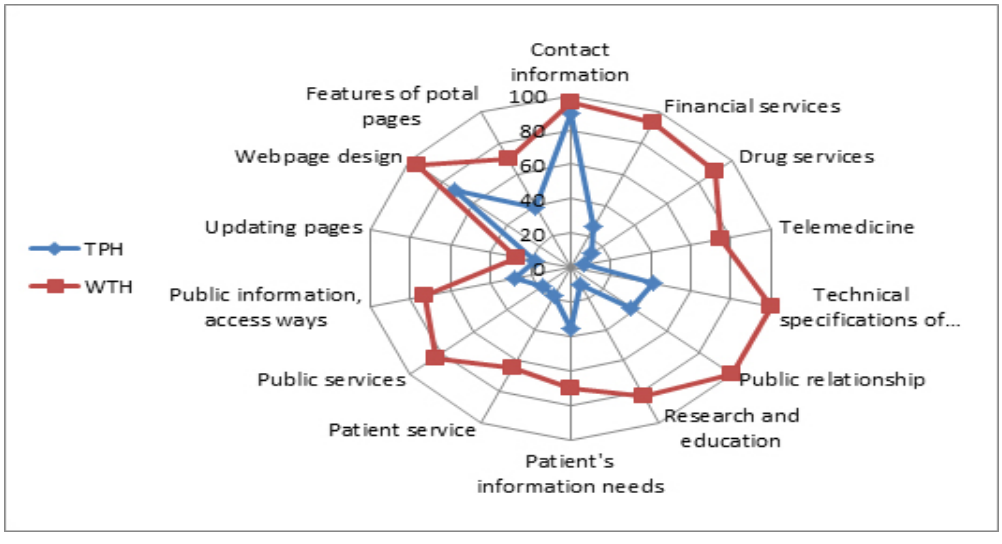
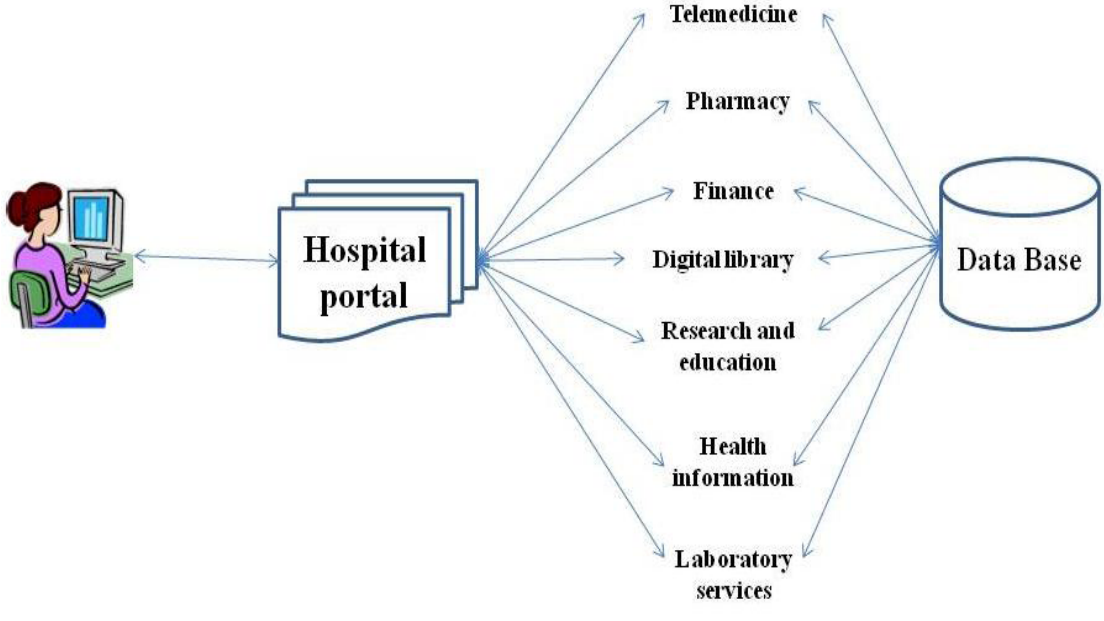


Figure 3. Hospital portal's conceptual model



According to the main emphasis of this study on the content of hospital portals, the proposed model in this study which is shown in Figure 4 covers these data.

Figure 4 is structured on 2 layers with 4 levels. The first layer that is shown below the Figure indicates the main criteria in this study. This layer includes two levels that are separated by two pale and full green colors. The bottom layer that is shown by full green color includes 10 main criteria. These criteria are too important in providing portal services. In fact, obtaining a minimum of 70 percent of the scores by WTH portals has led to their entrance to this layer. In other words, each one of the portals should observe these criteria and provide them in their services.

The above level includes 4 criteria. These 4 criteria have obtained a score below 70 percent. Consequently, their presence is not necessary, but they are needed in hospital portals. Especially hospital portals should provide services needed to their patients. So, they need to enhance their services and these criteria help them to think about further services.

The second layer of the model includes the sub-criteria studied in this research. This layer consists of two essential and needed levels such as the previous layer.

Figure 4. Proposed conceptual model to improve hospital portals

The essential level contains the sub-criteria that obtained at least 70 percent of the scores. The last level in the model (in the upper part of figure 4) consists of the sub-criteria that are not necessary but they are needed and presenting them can help hospital portal to improve the services delivered. Especially, it should be considered that hospital portals should provide high level services to their users. It should be explained that in some cases all the components of a criterion obtained over 70 percent of the scores and consequently all the sub-criteria were placed in the essential part of the layer.

According to the above-mentioned discussion, TPH portals should apply the model to enhance their services. In fact, some of the components were provided by some of the hospital portals, but in most cases, these services are not currently provided through the portals. Therefore, to develop more effective hospital portals, it is recommended that all the components of the proposed criteria, produced in this research, should be considered and offered to the customers.

Conflict of Interest

None Declared.

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