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Digital Transformation of the Health Sector in Greece: Evaluation of the Websites of Health Organizations in the Region of Attica

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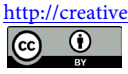

Abstract

The purpose of the current study is the comparison and evaluation of the websites of all the public hospitals and private clinics in the region of Attica and the identification of possible problems and content omissions that may be present in order to be amended or improved. The population of the survey includes all public hospitals and general private and quasi clinics which operate within the borders of Attica region excluding specialist outpatient private clinics. The analysis showed that the web pages of the private clinics and public hospitals in the Attica basin have a similar outline mainly in terms of their content and their design and are mostly informative concerning their structure but are less informative for users in terms of decision making and procedures on matters relating to their health. Therefore it becomes clear that these websites need to be improved and redesigned enough so as to reach a level that will meet the citizens' needs.

Keywords

Hospital Web Sites, Evaluation Model, eHealth, Criteria

1. Introduction

The last few years have seen a rapid development of technology which has been the driving force behind the formation of a "new world" of information. People, taking advantage of the quantum leap in the science of Information and Communication Technology (ICT), have managed to integrate this complex process

into their daily lives. As a result, the mundane process of browsing the internet has been established as the principal channel of communication radically altering the way people work, cooperate, retrieve information and has changed the entire health services spectrum in general (Stamouli et al., 2012).

The number of people using the internet is growing daily, while the time spent on it is also increasing making it the most popular ICT medium for all technological, financial and social activities (Kilias & Kalafatoudis, 2006). At the same time, the internet has entered the health field at a progressive pace, providing a variety of possibilities, such as "medical practice", "medical education and continuous training", "medical research", "informing the public about health and illness issues", but also "administration" and "organization" of the provision of health services (Kaldoudi, 2005).

People are increasingly resorting to the internet in order to be informed about general health issues, but also to seek information about hospitals and doctors (Leonardi et al., 2007). As a consequence, this leads to a more active participation in decision-making regarding their health. At the same time, in order to retrieve information on health issues, it is observed that individuals visit the websites of trusted organizations or large hospitals (Chondromatidou, 2010). "Research shows that patients use the internet primarily to search for information about diseases, diagnostic tests and treatment options" (Kaldoudi, 2005).

Zigmond, Lim, Ettner, & Carlisle, (2001), state that hospitals are motivated to be present on the internet and that information technology can in fact improve the care provided, but also promote the consumer's benefit of choice in matters related to his health. Websites can play a key role in a hospital's efforts to serve more patients, train its staff, increase its efficiency, promote health care (Stamouli et al., 2012), and reduce internal costs and bureaucracy (Randeree & Rao, 2004).

The website design of health care units has been done in such a way that they have mainly informative content. Websites vary from unit to unit as regards their structure and content, while differences are also observed between private and public sector.

Successful websites are so adapted to meet the expectations of every internet user who visits them. This is because not all users have the same behavioral pattern and not everyone needs the same range and type of content (Arsenis, 2011).

In an effort to improve the quality of health information on the Internet, Eysenbach (2000) recommends a four-pillar model of the E's. These four pillars are the following:

> "Educating consumers.
> Encouraging self-regulation of health information providers
> Evaluating information by third parties, and
> Enforcement, in case of fraudulent or positively harmful information" Eysenbach (2000).

Moreover, every health organization should maintain open channels of communication with society as a whole, enhancing the organization's outreach to-

wards the public by constantly providing it with the widest possible range of reliable and valid information. This makes the website appearance and efficiency of medical providers a very critical part of their marketing strategy, rendering the evaluation of their websites not just a requirement but also a duty. Evaluation is considered as the process through which website owners achieve the harmonization of the site to customers' needs and requirements (Katsoni et al., 2018; Jeddi et al., 2017).

For all these reasons with the present research a comparative study of the websites between public hospitals and private clinics in the Attica region is attempted as well as the evaluation of the adequacy of the provided information to citizens through the new information technologies (ICT) and specifically through the internet.

2. Categories and Criteria of the Webpages Evaluation Model

From bibliography (Smith, 1997; Lee et al., 2007) it has been highlighted that the evaluation of websites is gaining the users' interest.

Especially in the health sector where the information available on the websites of health organizations must be valid, of high quality and accurate (Chondromatidou, 2010), the evaluation of their websites becomes imperative.

A model of websites evaluation of health organizations was therefore created by Samara et al. (2011), which was based on other related surveys (Patsioura, Kitsiou, & Markos 2009; Mira, Llinas, Tomás, & Pérez-Jover, 2006; Norem & Moen, 2004; Randeree & Rao, 2004; Sánchez & Fuentes, 2002; Zigmond, Lim, Ettner, & Carlisle, 2001; Smith, 1997) and it is consisting of 49 criteria/questions that compose four categories of website evaluation (**Figure 1**). These categories are: 1) general information (consisting of 13 criteria), 3) specific health information (consisting of 11 criteria), 3) navigation and functionality (consisting of 13 criteria) and 4) communication and interactivity to health services (consists of 12 criteria).

The criteria by category are as follows:

The first evaluation category concerns the general information of the health organization, and includes the following criteria:

1) Profile of the hospital: refers to making reference to its history or/and the presence of an organizational chart that describes its organizational structure.

2) Management profile: includes the message of the Manager/President of the hospital or clinic, his Curriculum Vitae (CV) as well as information which concerns the members of the Board.

3) Business Plan: refers to the presence of a business plan, which describes the mission and goal of the hospital.

4) Capacity (beds): refers to the total number of beds available.

5) Headquarters: reference to the headquarters of the hospital or clinic and its full address.

6) Access to the health unit-map: includes ways of accessing the hospital or

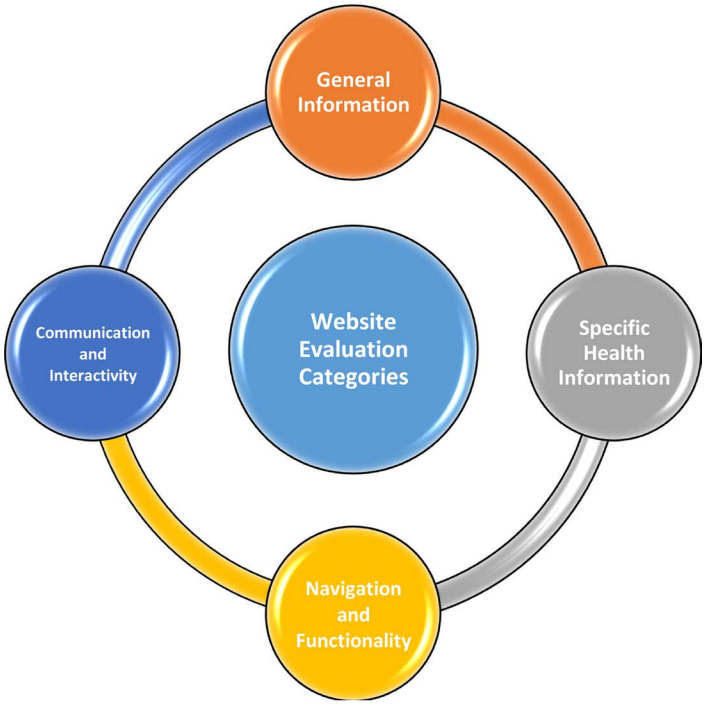

Figure 1. The four categories of the website evaluation model created by Samara et al. (2011).

clinic and the existence of a map or an explanatory drawing.

7) Service care level: it is the level of health care services (tertiary, secondary or both) to which the hospital/clinic belongs.

8) Up-to-date statistical data: includes recent statistical data such as the number of admissions, operations, financial data, etc.

9) Vacancy announcements: concerns announcements for any new vacancies in the health unit.

10) Press releases-announcements: refers to the existence of announcements and/or press releases, of the hospital or clinic.

11) Visitor information: relates to further services provided by the hospital/clinic, such as a church, a canteen, an ATM, a restaurant, etc.

12) Procurement notices: refers to the announcements concerning tender and procurement procedures.

13) Patient Frequently Asked Questions (FAQ's): refers to whether answers to frequently asked questions of patients are published.

The second evaluation category concerns specific health information and includes the following criteria:

1) Information about clinical wards: the existence of information about the clinical wards of the hospital or clinic is checked.

2) Information about the medical staff: refers to the existence of information concerning the doctors of the hospital/clinic, such as their names, the fields in which they specialize, their telephone numbers, etc.

3) Information about the nursing service: refers to the information about the

number of nurses, their names and the telephone numbers of the head of each department.

4) Hospitalization information: refers to the available information about the admission procedures, the discharges, the charges of the insurance funds as well as the rights and obligations of the patients and their companions.

5) Surgical operations: refers to the availability of information about the surgeries performed in the hospital/clinic, such as their type and the provided prior instructions for patient preparation.

6) Outpatient and afternoon clinics program: refers to the existence of a program regarding the hours and days that the doctors of the hospital/clinic receive patients.

7) On-call hours: this includes the reporting of the dates on which the Hospital is on-call time.

8) Current health issues: refers to information on blood donation, diseases, disease prevention, etc.

9) Educational programs: refers to the availability of information about educational programs organized by the hospital/clinic, such as seminars, etc.

10) Certifications from various organizations: the existence of a reference to the certifications that the hospital/clinic has been awarded from various organizations, such as ISO, the acknowledgments by organizations such as the World Health Organization, etc. is examined.

11) Publications of research-studies on health issues: the existence of studies or research of the staff of the hospital or clinic, in scientific journals and conferences is examined.

The third evaluation category concerns information about navigation and functionality and includes the following criteria:

1) Ability to return to the home page from any point: it is checked whether the user can return to the home page from any part of the website.

2) Links to other health units-health institutions: it is examined whether the hospital/clinic provides the users with important links to other hospitals, clinics, Ministry of Health, National Organization of Medicine (NOM), etc.

3) Broken links: this term refers to links that are on the hospital/clinic website in order to redirect the user to another website but have an error.

4) Additional WEB components: refers to the existence of interactive multimedia components, for example animations and various effects used to enrich a web page.

5) Site Map: is a detailed list that shows information about all the sections, pages, videos or other files located on the website of the hospital.

6) Menu Bars: these are widgets with drop-down menus from which the user can make the desired choices.

7) Website update date: refers to the time when the last conversions and modifications were made to the website and is usually presented at the end of each page.

8) Technologies used: refers to the technologies used in the hospital/clinic website (HTML, PHP, JSP (JAVA), FLASH, and ASP). In order to detect them, an add-on called Wappalyzer (2019) was used through Mozilla Firefox, which recognizes the software running on each web page.

9) Photos: refers to the presence of pictures.

10) Audio, Video, Animations: refers to the presence of sound effects, videos, and animations.

11) Language selection option: the option of choosing other browsing languages besides Greek is examined.

12) Search bar/search box: refers to the special input frame or location within the website of the hospital/clinic where the user can type in to search directly for an item.

13) Text-Image-Color Balance: with this criterion, the website is examined, in terms of aesthetics and colors. It is characterized as: Very Good, Good and Moderate.

14) Title and logo of the health unit on each page: it is examined if the title and the logo of the hospital/clinic are present in all parts of the website.

The fourth evaluation category relates to communication and interactivity in health services and includes the following criteria:

1) Access to procurement notices: this criterion refers to the ability of the website user to access the electronic texts of tender and procurement procedures, for example "The Transparency Portal" (diavgeia) of Ministry of Digital Governance (2019).

2) Electronic procurement services: examines the possibility of prospective suppliers to be able to submit their offers (price quotes) electronically to the hospital/clinic.

3) Communication forum with the doctors of the health unit: it refers to the existence of a virtual space in the form of an electronic forum that enables the users to communicate with the doctors of the hospital/clinic.

4) Online patient satisfaction questionnaire: it refers to the existence of an electronic questionnaire, which records the satisfaction of patients with the services provided.

5) Contact telephone numbers for appointments: examines the existence of contact telephone numbers for making an appointment with the hospital/clinic.

6) Online appointment: the ability for online appointment is examined, through an online registration form.

7) Information about the library: it checks the existence of a hospital library as well as the availability of its contact details.

8) Maintenance of user visits to the site: the criterion examines the presence of a visits counter. Usually, this number appears on the side or at the end of the webpage.

9) Users' access to their medical history-medical record: the ability of patients to access their medical record, which is available in electronic form, as well as

their medical history, is examined.

10) Report on the existence of information systems in divisions-departments: it refers to the existence of integrated information systems in the departments of the hospital/clinic.

11) Telephone contact availability: refers to the existence of a telephone contact number with the hospital/clinic.

12) Electronic communication form with the health unit: refers to the existence of a special form through which electronic submission of comments, questions and electronic communication in general, can be performed between users and the hospital/clinic.

It is noted that the above criteria were identical for both public hospitals and private clinics except for those that do not appear on the websites of private clinics and which are the following:

- Business plan: because private clinics do not normally make known their business planning to the public.
- Procurement notices: access to procurement notices and electronic procurement services, because procurements in the private sector are not carried out in the same manner as public procurements and are not required by law to publish information relating to these procedures.
- On-call duty: because private clinics are on call 24 hours a day, and
- Hospital library information: because private clinics do not usually have libraries.

It is pointed out that the comparison between the websites of public hospitals and private clinics was based on common criteria only.

3. Material and Method

As earlier mentioned, the evaluation model developed by Samara et al. (2011) was used for the evaluation and comparison of the websites of the public hospitals and the private clinics of the Attica region. This consists of 49 criteria that compose the following four categories of website evaluation: 1) general information, 2) specific health information, 3) navigation and functionality and 4) communication and interaction in health services.

For most criteria, presence (Yes) was recorded when the criterion is displayed on the website or absence (No) when the criterion is not displayed on the website, except for some criteria for which different information was recorded such as very good, good, moderate, but only if the criterion appeared on the respective website.

The research population consisted of all public hospitals and the general and complex private clinics, which operate in the Attica region, without including specialist outpatient private clinics. The procedure for locating those medical units was as follows: In the first stage, the collection of all public hospitals which operate within the Attica region was made, based on information from the websites of the 1st Health District (2019), the 2nd Health District of Piraeus and the

Aegean (2019) and the Health Atlas (2019). In the next stage with the use of the google search engine, the website of each hospital was separately searched. In those cases where no website could be located with the above procedure, a follow up call with the hospital was conducted to verify the non-existence of a website for that hospital.

In order to locate the private clinics under study which operate in the Attica region, firstly the data maintained on the website of the Health Atlas (2019) as well as the Hellenic Ministry of Health (2019) were cross-examined. Afterwards the identification of their websites, as well as the confirmation process in case a website could not be found, was carried out in the same manner as in public hospitals.

With this process, 38 public hospitals and 47 private clinics of various categories and capacity (beds) were found operating in the Attica region. Out of the 38 public hospitals, only 29 had active websites (76.3%), while out of the 47 private clinics, 39 (83.0%) had active websites. The process of locating these websites, as well as evaluating their information, was carried out by the researchers from September 2019 until December 2019. The statistical analysis and data processing were performed with the statistical software platform SPSS v25.

The current research was carried out within the framework of the Postgraduate Program "Health and Social Care Management" of the University of West Attica and its main objective was the evaluation and comparison of the websites of public hospitals and private clinics, which operate within the Attica region. Its individual objectives were to research the degree of adequacy of the content and the design of their websites as well as to highlight problems and content omissions that may be present, in order to be amended and improved.

4. Statistical Analysis

4.1. First Evaluation Category

Based on the statistical analysis for the *first category* of the model which includes 13 criteria related to general information, it was observed that (**Table 1**) most public hospitals provide information on their profile in their website (96.6%), about their headquarters (96.6%) and about ways to reach to the hospital together with a map or an explanatory drawing with instructions that facilitate access to it (79.3%). Also, most of them (69.0%), include press releases and announcements on their website, as well as announcements regarding tender and procurement procedures (86.2%). Less than half of the public hospitals (48.3%) provide information on their capacity and the level of health care services to which they belong (44.8%). On the contrary very low percentages were recorded regarding the information on the management profile (such as the message from the Director, his CV and information about the members of the Board) (34.5%), the job vacancies (27.6%), and the additional information for the visitors such as the canteen, ATM etc. (31.0%). Finally, even lower percentages were recorded as regards updated statistical data (6.9%), and the Frequently Asked Questions (FAQs)

(3.4%) by the users, while no hospital (0.0%) provided information about its business plan.

Regarding the same model category, the situation of private clinics as shown in Table 1 is as follows: all private clinics (100%) provided information on the location of their headquarters and its full address; most of them (92.3%) included information on types of access, as well as a map or an explanatory drawing for user convenience. A large percentage (61.5%) provided information on the level of health care services to which they belong, while more than half (53.8%) provided information on their capacity. Lower scores were recorded concerning information about the profile (48.7%) and the press releases (46.10%) while even lower percentages were recorded concerning the visitor's information (38.5%) the updated statistical data (35.9%), the information regarding the management profile (20.5%) as well as the job vacancies (20.5%). The rates for the Frequently Asked Questions (FAQs) (5.1%) were disappointingly low.

4.2. Second Evaluation Category

The statistical analysis for the *second category* of the model, which includes 11 criteria related to specific health information, showed that (Table 2) most public hospitals provided information on their website about their clinical departments (86.2%), hospitalizations (75.9%), performed surgeries (65.5%), medical staff (62.1%) as well as the educational programs organized by the hospital (62.1%). 55.2% of the hospitals provided information about the schedule of outpatient and afternoon clinics, while lower percentages were recorded for information

Table 1. General information.

Criteria	Public Hospital				Private Clinic			
	No		Yes		No		Yes	
	n	%	n	%	n	%	n	%
K1	1	3.4	28	96.6	20	51.3	19	48.7
K2	19	65.5	10	34.5	31	79.5	8	20.5
K3	29	100.0	0	0.0	-	-	-	-
K4	15	51.7	14	48.3	18	46.2	21	53.8
K5	1	3.4	28	96.6	0	0.0	39	100.0
K6	6	20.7	23	79.3	3	7.7	36	92.3
K7	16	55.2	13	44.8	15	38.5	24	61.5
K8	27	93.1	2	6.9	25	64.1	14	35.9
K9	21	72.4	8	27.6	31	79.5	8	20.5
K10	9	31.0	20	69.0	21	53.8	18	46.2
K11	20	69.0	9	31.0	24	61.5	15	38.5
K12	4	13.8	25	86.2	-	-	-	-
K13	28	96.6	1	3.4	37	94.9	2	5.1

Table 2. Specific health information.

Criteria	Public Hospital				Private Clinic			
	No		Yes		No		Yes	
	n	%	n	%	n	%	n	%
K1	4	13.8	25	86.2	4	10.3	35	89.7
K2	11	37.9	18	62.1	18	46.2	21	53.8
K3	19	65.5	10	34.5	38	97.4	1	2.6
K4	7	24.1	22	75.9	14	35.9	25	64.1
K5	10	34.5	19	65.5	12	30.8	27	69.2
K6	13	44.8	16	55.2	34	87.2	5	12.8
K7	8	27.6	21	72.4	-	-	-	-
K8	20	69.0	9	31.0	12	30.8	27	69.2
K9	11	37.9	18	62.1	34	87.2	5	12.8
K10	28	96.6	1	3.4	21	53.8	18	46.2
K11	19	65.5	10	34.5	26	66.7	13	33.3

related to the nursing services (34.5%), the publications of research-studies (34.5%), as well as those related to health issues (31.0%). Almost none of the hospitals (3.4%) provided information on awarded certifications from established organizations.

Concerning the same category of criteria, the status of private clinics was as follows (Table 2): most of the private clinics (89.7%) provided information on their websites about their clinical departments (89.7%), the performed surgeries (69.2%), current health issues (69.2%) as well as hospitalizations (64.1%). Lower percentages were recorded for published information concerning medical staff (53.8%), certifications awarded from established organizations (46.2%), published information regarding research-study publications (33.3%) and even lower for information provided regarding the outpatient and afternoon clinics schedule (12.8%), as well as the educational programs organized by the clinic (12.8%), which were not satisfactory. Finally, the information regarding the nursing service was almost non-existent, although the nursing service is regarded as one of the most important services provided by a health organization.

4.3. Third Evaluation Category

Regarding the *third category* of the model which comprises 14 navigational and functionality criteria, the statistical analysis showed that (Table 3) most public hospitals provide information about the title and logo of the hospital on their website (93.1%), they have pictures (89.7%), they report the date of last update (65.5%), they provide users with links to other hospitals, clinics, Ministry of Health etc. (62.1%) and they have a very good text-image and color balance (65.5%) (Table 4). The percentages of information regarding the additional WEB

elements (58.6%), the existence of menu bars (58.6%) and the special search bar/search box (58.6%) were satisfactory, while only the 31.0% of the public hospitals included a site map and the 20.7% have audio, video and animations. The percentages of the hospitals providing the option to display a different site language (13.8%) were not satisfactory, while no public hospitals were found that provide the possibility to return to the home page from any point of the website. It is also worth noting that the percentage of the hospitals that have broken links on their websites was quite large (62.1%).

Concerning the same category of the model, private clinics present the following picture (Table 3): most clinics included their title and logo on their website (97.4%), they had pictures (92.3%), they allowed the user to return to the home page from any part of the website, (89.7%), included additional WEB data (79.5%) and they reported the date of the last update of the website (69.2%). In addition, 84.6% have a very good balance of text-image and color (Table 4), while the percentage of those who had menu bars on their websites (56.4%) as well as a special search box/search bar (59.0%) was satisfactory. However, the percentage of the clinics providing the option to change the site language was lower (48.7%), as well as of those which provided links to other hospitals, clinics, Ministry of Health, etc. (43.6%), and of those which had a site map (30.8%). It is pointed out that only 12.8% of private clinics had broken links on their websites.

A large percentage of both public hospitals (58.6%) and private clinics (59.0%) use HTML, PHP and FLASH technologies on their websites (Table 5).

Table 3. Navigation and functionality.

Criteria	Public Hospital				Private Clinic			
	No		Yes		No		Yes	
	n	%	n	%	n	%	n	%
K1	29	100.0	0	0.0	4	10.3	35	89.7
K2	11	37.9	18	62.1	22	56.4	17	43.6
K3	10	34.5	19	65.5	34	87.2	5	12.8
K4	12	41.4	17	58.6	8	20.5	31	79.5
K5	20	69.0	9	31.0	27	69.2	12	30.8
K6	12	41.4	17	58.6	17	43.6	22	56.4
K7	10	34.5	19	65.5	12	30.8	27	69.2
K8	Table 4		Table 4		Table 4		Table 4	
K9	3	10.3	26	89.7	3	7.7	36	92.3
K10	23	79.3	6	20.7	19	48.7	20	51.3
K11	25	86.2	4	13.8	20	51.3	19	48.7
K12	12	41.4	17	58.6	16	41.0	23	59.0
K13	Table 5		Table 5		Table 5		Table 5	
K14	2	6.9	27	93.1	1	2.6	38	97.4

4.4. Fourth Evaluation Category

Based on the statistical analysis of the *fourth category* of the model that includes 14 criteria for assessing communication and interactivity in health services, it was found that (Table 6) all (100.0%) public hospitals provided users with the option of telephone communication with the hospital. Most of them gave the option of making an appointment through the telephone (93.1%) as well as access to procurement call for tenders (86.2%). The percentage of hospitals that provided an electronic contact form with the health unit on their website was

Table 4. Criterion 8: Technologies used in hospitals and clinics' sites.

	Public Hospitals	Private Clinics
HTML	1 (3.4%)	2 (5.1%)
HTML και PHP	2 (6.9%)	2 (5.1%)
HTML και FLASH	2 (6.9%)	5 (12.8%)
HTML, PHP και FLASH	2 (6.9%)	23 (59.0%)
ASP, FLASH και HTML	17 (58.6%)	6 (15.4%)
HTML, JSP και FLASH	4 (13.8%)	1 (2.6%)

Table 5. Criterion 13: Balance between text-image-colors.

	Moderate	Good	Very Good
Public Hospitals	7 (24.1%)	3 (10.3%)	19 (65.5%)
Private Clinics	3 (7.7%)	3 (7.7%)	33 (84.6%)

Table 6. Communication and interactivity in health services.

Criteria	Public Hospitals				Private Clinic			
	No		Yes		No		Yes	
	n	%	n	%	n	%	n	%
K1	4	13.8	25	86.2	-	-	-	-
K2	24	82.8	5	17.2	-	-	-	
K3	29	100.0	0	0.0	38	97.4	1	2.6
K4	28	96.6	1	3.4	37	94.9	2	5.1
K5	2	6.9	27	93.1	20	51.3	19	48.7
K6	28	96.6	1	3.4	34	87.2	5	12.8
K7	18	62.1	11	37.9	39	100.0	0	0.0
K8	26	89.7	3	10.3	39	100.0	0	0.0
K9	29	100.0	0	0.0	39	100.0	0	0.0
K10	26	89.7	3	10.3	39	100.0	0	0.0
K11	0	0	29	100	0	0.0	39	100.0
K12	15	51.7	14	48.3	10	25.6	29	74.4

satisfactory (48.3%), as well as the percentage of hospitals that provided information about the library (37.9%). It is pointed out that the percentage of hospitals that gave the suppliers the option to submit their offers electronically, was not satisfactory (17.2%). The same applies for information provided about the website visits counter (10.3%), as well as the information about the level of information systems integration in the hospital sectors (10.3%), while hardly no hospital included an online patient satisfaction questionnaire (3.4%), nor did it allow users to make online appointments via an online registration form (3.4%).

In the same category of the model, the statistical analysis showed that (Table 6) all private clinics provided telephone contact number/s on their website, while most of them had an electronic contact form (74.4%). The percentage of private clinics that gave the option of making an appointment through the telephone on their website was satisfactory (48.7%), while the percentage of clinics that provided the suppliers with the option to submit their offers electronically was disappointingly low (5.1%). The same applies for the percentage of those clinics which had a forum for communication with doctors (2.6%). The remaining criteria of the same category were not found on the websites of the private clinics except from those that refer to procurements which, as mentioned, are not required by law to publish them.

4.5. Summary of the Statistical Analysis

In order to have a complete picture from the comparison between the websites of public hospitals and private clinics, the results of the statistical analysis were summarized in the following points:

- In the first category of the model, where the general information of the health organization is presented, public hospitals and private clinics have a similar picture on their websites for most of the criteria except for the criterion of the level of health care services with which the hospital/clinic belongs, where more private clinics tend to provide this information to users. The opposite picture is observed in the criterion of the existence of announcements and press releases, where public hospitals present this information on their websites to a greater extent.
- In the second category of the model where general information of the health organization is presented, public hospitals and private clinics, have a similar picture on their websites for most of the criteria. A different picture is shown in the criteria of outpatient and afternoon clinics program and of the educational programs organized by the health organization, where public hospitals have more information on their websites, while the opposite picture is presented for the criterion of the current health issues (information diseases, disease prevention etc.) where it is recorded that private clinics include more information. As regards the criterion for the information about the nursing service, we highlight that much more public hospitals include this information on their sites.

- In the third category of the model where websites' navigation and functionality information is presented, more public hospitals provide a sitemap on their websites and links to other health units. On the other hand, the private clinics have, to a greater extent, functionality components on their websites such as links to return to the home page from any part of the site, additional components to enrich their webpages, such as multimedia components, animations, sound effects and videos and a much smaller percentage of broken links showing that they maintain and update their webpages more often than public hospitals. Regarding the other criteria of the category public hospitals and private clinics present almost similar patterns.
- In the fourth category of the model where information regarding communication and interactivity in health services is presented, public hospitals provide in higher percentage contact telephone numbers for appointments, while private clinics provide to a greater extent the electronic communication option, such as a special form through which electronic submission of comments, questions, etc. can be performed between users and the clinic. For the other criteria of this category, public hospitals and private clinics either present a similar picture or cannot be compared because there is no such criterion for the private clinics.

5. Discussion

The main objective of this study was the evaluation and comparison of the websites of public hospitals and private clinics, which operate in the Attica region. The individual objectives were to research the degree of adequacy of the content and the design of those hospital and clinics websites as well as to highlight possible problems and content omissions, in order to correct and improve them.

The recorded findings showed that there are more public hospitals than private clinics that, through their websites, provide information about their history and organizational structure. The inverse pattern is observed as regards dissemination of statistical data, which shows that private clinics tend to publish more information regarding their inflows and outflows. In addition, the statistical analysis showed that the percentage of public hospitals that provide information to the public about their nursing services, their outpatient and evening clinics and the training programs they implement, is higher than that of private clinics. At the same time, however, there appear to be more private clinics that display current health issues on their websites, such as information on blood donation, diseases and disease prevention.

The statistical findings also showed that, private clinics, on the basis of their promotion and extroversion, publish to a larger extent, compared to public hospitals, the certifications they have received such as ISO, acknowledgments from international organizations, etc. and at the same time they include at a higher percentage, pictures, sound effects and animations. As a result, their web pages are easier to use and the navigation through them is more user-friendly and en-

joyable. Moreover, it appears that private clinics update and refresh their websites more often than public hospitals, as the percentage of broken links found on them is lower than that found on the webpages of public hospitals, while they also include the option to choose a different browsing language in addition to Greek to a greater extent.

It was also found that the percentage of public hospitals that provide users with contact information and the option to make telephone appointments with health units is higher than that of private clinics, as well as the presence of website visits counters. In contrast, private clinics provide users with the option of electronic communication through a special electronic form at a higher degree than public hospitals.

6. Conclusion

From the above findings, we can conclude that the websites of public hospitals and private clinics operating in the Attica region have a similar pattern, mainly in terms of their content and design. It also seems that they mainly have an informative nature regarding their structure but at the same time are less informative for the users in terms of procedures and decision making on the issues that concern the users' health. In addition, as regards the types of communication with the organization itself, it seems that the traditional method via the telephone is more promoted compared to modern electronic methods through mail, forums, special communication forms, etc. It can therefore be deduced that these websites need to be redesigned and improved in order to reach a level that will meet the citizens' needs and also possible users should lower their expectations regarding the functionality and effectiveness of these websites (Zigmond et al., 2001).

At the same time the fact that the number of people who use the Internet to search for health-related information is constantly increasing, and that eHealth services are changing the context and form of health care (Roumeliotaki & Chronaki, 2009), render it necessary to constantly redesign and update the websites of public and private health units, so as to increase the quality and effectiveness of their online communication with society. In that way, the websites of health organizations will be transformed into a modern access point for all hospital services that will meet the individual needs of citizens (Sánchez & Fuentes, 2002). This should be performed by the specially trained staff of each unit, in collaboration with other scientists, such as persons specializing in marketing and health communication, in order to identify future needs that arise, either in technological or social level.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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