WEB Based Education for Primary Care Physicians and their implication in Prostate Cancer Screening

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Abstract: - Today in each domain of specialty and especially in medicine, a large volume of information is accumulated; this must be transposed from the medical practice guidelines to resident doctors and primary care physicians. Internet applications play an important role in transmitting this information. In our paper we introduce an online application addressed to the primary care physicians, which is useful for their continuous medical education and can provide direct involvement in screening and early detection of prostate cancer.

Key-words: - Prostate Cancer, Screening, PSA, PHP, HTML, JavaScript, MySQL, CSS

1 Introduction
Today prostate cancer is one of the most important health problems in men, outnumbering lung and colorectal cancer, with an incidence rate of 214 cases per 1000 men [1]. It is the second leading cause of cancer death in men. The incidence increases with age, being a greater health problem in developed countries where there is a high percentage of elderly population and where disease incidence reaches 15% of all cancer types in men. Screening and early detection by determining the PSA (Prostate Specific Antigen) and DRE (Digital Rectal Examination) are effective methods of reducing the specific mortality. “What really needs to be done is to educate our primary care physician colleagues that the sky will not fall if they use PSA testing intelligently. Putting this number out there will help urologists educate our colleagues and save lives.” says Dr. Catalona in a speech at AUA, Annual Meeting 14@19 may 2011. The proposed online application uses at implementation level the server application PHP.

The site can be accessed by users with few experiences in using the internet. The language PHP has a special flexibility it permits to also be used with other technologies. The written online application will be posted on a web server in PHP and this can be accessed by any visitors. After authentication, the primary care physician can access the web application an use any of the tests in correspondence with the posted courses of urology.

2 Theoretical Aspects
In this chapter we will made a brief presentation about the prostate cancer and about the technologies used to develop the online application.

2.1 Prostate Cancer

2.1.1 Risk Factors
Risk factors for the occurrence of clinical prostate cancer are not well known, although some of them have been identified. Of these only three have been established as risk factors: increasing age, ethnical origin and heredity. Although the disease frequency (after performing the autopsy) is similar in other parts of the world, the clinical incidence is different. This is high in northern Europe and USA and low in Southeast Asia. The dietary and nutritional factors are also believed to be involved [14-17].

2.1.2 Screening and early detection
Having certain specific features like histological precursor lesions (PIN), availability of serum markers (PSA), long latency and high prevalence, endocrine dependency makes prostate cancer as an ideal candidate for prevention and early detection. At least four questions arise in regards to screening and early detection of prostate cancer,: 1. Who does do the screening; 2. What methods of screening will be used ; 3. At what age should we start the detection ; 4. What is the tracking and rhythm
interval. The answer for the first question is the urologist and the primary care physician, if he is well informed and has the proper knowledge. For the second question, the answer is the PSA and DRE and also risk assessment. For the third question, the answer is as follows: cancer detection starts at the age 40 according to the European Association of Urology Guidelines 2010 edition and Comprehensive Cancer Network (NCCN) 2010 Guidelines; at ages 40-45 for person with high risk and at age 50 for men with average risk according to the AUA and ACS guidelines. For the fourth question the answer according to the European Association of Urology Guidelines 2010 edition, if PSA is <= 1ng/ml, every 8 years, in men older than 75 years with baseline PSA <= 3ng/ml, further PSA testing is not necessary because of very low risk of dying from prostate cancer.

NCCN adds repeat screening at age 45 and 50 for men with average risk for cancer, using PSA (< 1ng/ml) and annual followup for men with high risk. The information described is is available in online courses designed to improve the management of male patients over 40 years for early detection of prostate cancer.

PSA screening can reduce prostate cancer specific mortality by 20% according to the European Randomized Study of Screening for Prostate Cancer (ERSPC). The SEER registry (U.S. Surveillance Epidemiology and End Results) indicates a reduction of 75% of metastatic disease by applying PSA screening.

2.1.3 Diagnosis
Diagnosis of prostate cancer is made by anathomopathological exam of the resulting piece from prostate biopsy (ultrasound-guided transrectal biopsy). The PSA test can reduce the number of unnecessary biopsies for prostate cancer.

2.2 Technologies
The Web application is designed for primary care physicians who need to authenticate and as such gaining access to updated urology courses on different themes.

Each course has a a variety of multiple choice tests attached, designed to verify the accumulated knowledge (Fig.1). Following this initial theoretical phase, a practical phase is included, where primary care physicians are implicated in the screening of prostate cancer. Thus the primary care physician will fill out an application for each male patient of age 40 and above. This application will include the following data: name, surname, age, gender, address, ethnicity, first and second degree relatives with diagnosed prostate cancer and age of diagnosis, initial PSA value, DRE aspect. Depending on the PSA value the protocol will be the following: PSA<1ng/ml – patient reevaluation with PSA and DRE at ages of 45 and 50; PSA>1ng/ml reference to urology specialist; suspicious DRE –reference to urology specialist.

The primary care physician is in constant contact with the urology specialist during the entire time. For starters 5 primary care physicians were implicated in the project. Patient charts can only be accessed by the primary care physician and urology specialist and not by the other users.

The application is currently being used for prostate cancer alone, but can be updated for various other afflictions.

2.2.1 HTML and CSS rules, JavaScript, PHP
HTML (Hypertext Markup Language) is the most important markup language for the web, designed for delivering a document on the Web. HTML is compatible with the most operating systems and software [10].

CSS rules help us to create visually pleasing website[5].

There are three basic concepts with which are deal JavaScript: objects, events, and functions. Some advantages of JavaScript language are: it is dynamic, interpreted, prototype-based language and flexible [8].

PHP is a server-side scripting languages and allows the development of web application. [3, 13].

2.2.2. Database
A database is a collection of data arranged for ease and speed the search and retrieval (American...
MySQL is a relational database management system (RDBMS)\textsuperscript{[13]}. MySQL has many advantages like: high performances, easy to configure and learn, portable and low cost.

3. Problem Design and Implementation Aspects

The developed software is a WEB application uses JavaScript as the programming language, the server side scripting language PHP and the database is created using SQL and MySql. The application is granted for four categories of users: the administrator, the user, the lecturer and the visitor \textsuperscript{[6,7,10,11,12]}.

The administrator is the person which has access to all parts of the application allowing him to manage the database information.

The user is the family physicians, which has access to certain parts of the application, after authentication.

The lecturer is the specialist in urology (Dr. Ion Sacarneciu), which has access to certain parts of the application, after authentication. He can upload the courses, the tests and can answer to several questions put by the family physicians concerning the uploaded documents.

While creating the software system “Curs de urologie” (Fig.2), we take into consideration the following characteristics:

- Modular construction, apt to be easily extended and also used for other courses;
- Dividing the application in windows based on the required functionality. Each window is loaded into the application interface independent of each other.

Any visitor can see a brief summary of the courses and can access the extended course and all the tests corresponding to the courses only if they have an ID and password (Fig.3).

![Fig.3. The windows with the brief summary and the request for authentication to access the course](image)

During the registration session (Fig. 4) every user will receive a user ID and a password. In general, the user ID is the e-mail address of each user.

![Fig.4. The window with the registration](image)

To obtain the access to the courses and tests on the site, the administrator must check in the box Activ/Inactiv (Active/Inactive) (Fig.5), in the administration panel for registered users. So, it is possible that each primary care physicians to have access at the documentations posted on the site and has also the possibility to download information on...
the PC. After authentication, each link allows to access a course or test (Fig.6).

The primary care physicians are able to check the obtained knowledge from the course of urology by accessing the test link (Fig.6).

The primary care physicians have the possibility to be informed about the various grade obtained for the different tests found on the site and the date of accessing the test.

The results are suggestive represented using a pie chart (Fig.7).

Fig. 7. The window with results of tests supported

The doctor is able to add a comment on ongoing or completed tests or about the courses. (Fig.8).

4 Conclusion

This software application has been created to be easily scalable and adaptable (on request) to other medical courses.

The application uses PHP server-side scripting language, MySQL database, all of these technologies are open sources, and allow easy implementation on any server with any operating system.

The Web application that we developed is addressed to primary care physicians.

The Web application is a quick way of updating the knowledge about urology on a given theme (in this case prostate cancer).
The primary care physicians are involved in the screening of prostate cancer through the practical phase of the Web application.

The Web application can be updated to other themes as well (including practical phases).

The Web application provides a constant, direct and fast contact between the urology specialist and the primary care physician.

The primary care physician involvement is key to this application, thus better management of patients with prostate cancer is ensured.

Acknowledgements

Many thanks to Mr. George G. Sangeorzan from Hillside Product Design Limited, Teignmouth, U.K, Product Designer, for creating the logo of the site.

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