Chapter 7 Conclusion

7.1 Introduction

The aim of this chapter is to provide an overall conclusion of the research regarding the findings of the activities undertaken in the literature review, research methodology, questionnaire design, data collection and data analysis. Derived from the previous chapters this last chapter will address the research objectives and see if they have been achieved. The researcher further presents the data after testing computer based program in diagnosis of benign prostatic hyperplasia patients. Lastly the researcher presents the future direction of the research and finally makes an overall conclusion.

7.2 Conclusion of Findings in Relation to the Objectives

The directions of the research are to achieve the objectives which are as follows:

1. **To identify diagnostically significant symptoms and signs of the major prostate diseases, which are revealed through urine derangements.**

   This research employed quantitative research method and the finding from the interview and questionnaire survey helped the researcher to identify signs of enlargement of prostate. In this way, it is drawn a clear picture about Benign Prostatic Hyperplasia development in men.

2. **To study the current method in detecting BPH.**

   From the interview and questionnaire survey the respondents clearly stated the current methods have been using in detecting BPH. The researcher implemented all required methods of diagnostic into the Computer Based Program.
3. To develop a program that more agile improving diagnosis of benign prostatic hyperplasia patients using computer based program.

A computer based program was developed to diagnose in improving diagnosis benign prostatic hyperplasia patients. In a short time, various treatments according to diagnosis have presented for urologist and nurse.

Results in using computer based program in hospitals.

Computer based program prototype was tested in urological department. The computer based program offer an efficient way of diagnostic and treatment of the patients with BPH. The results of test are mentioned below, with the display of program screen shots. Figure 7.1 shows the patient details such as: First Name, Last Name, Year of birth, Age and IC Number; for hospital details: Patient’s Card Number, Doctor’s Name and date of checkup.

![Figure 7.1: Patient Details and Hospital Details](image-url)
Figure 7.2 shows the patient’s subjective complaints that are ticked, and after pressing button *Specify Diagnose*, the diagnosed shown: BPH and Prostatitis.

![Figure 7.2: Subjective complaints of the patient with the elaboration of a preliminary diagnosis](image)

Figure 7.2: Subjective complaints of the patient with the elaboration of a preliminary diagnosis

Figure 7.3 shows the total of IPSS and QOL, each of them has drop down menu where the doctor choose suitable answer, and by pressing button *DONE*, the program automatically display the total score and the symptom.

![Figure 7.3: International Prostate Symptom Score and Quality of Life](image)

Figure 7.3: International Prostate Symptom Score and Quality of Life
Figure 7.4 shows the instrumental examination options. First digital rectal examination, where drop down menu display the options, PSA results, ultrasound data: size of gland is determined by providing dimensions of gland. Pressing button \textit{CAL} the automatically calculate size in cm$^3$. As well as Parenchyma and Contour options are presented, and finally uroflometry data: total of urine left and the maximum urine flow.

![Figure 7.4: Instrumental Examination](image)

Figure 7.5 shows the map shot of diagnoses summary, in short terms such as: S28, L5, Q12, R89, V93 and BPH + Prostatitis. These means IPSS is 28 which is \textit{severe}, and QOL is 5 which is Unhappy, Urine flow rate is 12 and residual urine inside bladder 89ml, the size of gland is 93cm$^3$ and diagnose Benign Prostatic Hyperplasia plus Prostatitis.
After all diagnoses the treatment options are shown, *open operation and laser treatment* was suggested for the above diagnose for the patient Maskurov Ilez (Figure 7.6).

The researcher decided to show several tests of the patients that are done using Computer Based Program in diagnostic and treatment (Table 7.1).
Table 7.1: The patients’ result on diagnostic and treatment

<table>
<thead>
<tr>
<th>Patient Name</th>
<th>Age</th>
<th>Card #</th>
<th>Complaints</th>
<th>Preliminary diagnose</th>
<th>IPSS</th>
<th>QOL</th>
<th>DRE</th>
<th>PSA (ng/ml)</th>
<th>Size (cm³)</th>
<th>Parenchyma</th>
<th>Total urine (ml)</th>
<th>Max urine flow (mL/sec)</th>
<th>General diagnose</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culoev Abukar</td>
<td>56</td>
<td>41</td>
<td>Micturition, Frequent urge for urination during day, Strangury, Feeling on incomplete bladder emptying and reduction of potency</td>
<td>Prostatitis</td>
<td>25</td>
<td>5</td>
<td>Considerably expanded, painless and of elastic consistency</td>
<td>not done</td>
<td>32</td>
<td>heterogeneous with areas of high echogenicity and contour smooth and sharp</td>
<td>150</td>
<td>32</td>
<td>S25 L5 Q32 R150 V32</td>
<td>Prostatitis TURP and Conservative Therapy</td>
</tr>
<tr>
<td>Gandarov Akhmed</td>
<td>70</td>
<td>21</td>
<td>Nocturia, Feeling on incomplete bladder emptying and absence of ability to keep urine</td>
<td>BPH</td>
<td>29</td>
<td>5</td>
<td>Moderately expanded, painless and of elastic consistency</td>
<td>not given</td>
<td>77</td>
<td>homogeneous and contour smooth and sharp</td>
<td>150</td>
<td>9</td>
<td>S29 L5 Q9 R150 V77</td>
<td>BPH Open Operation or Laser Treatment</td>
</tr>
<tr>
<td>Marzaganov Musa</td>
<td>65</td>
<td>68</td>
<td>Micturition, Frequent urge for urination during day, Delay of urine in an anamnesis, Feeling on incomplete bladder emptying and Frequent nocturnal erection</td>
<td>Suspicion on Cancer</td>
<td>9</td>
<td>4</td>
<td>Presence of thick regions regardless of dimensions and boundaries</td>
<td>12</td>
<td>46</td>
<td>homogeneous and contours smooth and sharp</td>
<td>67</td>
<td>5</td>
<td>S9 L4 Q5 R67 V46</td>
<td>Suspicion on Cancer TRUSI or Biopsy of Prostate</td>
</tr>
</tbody>
</table>
7.3 Conclusion

Clinical symptoms in BPH are extremely diverse and depend on many factors. Symptoms and various manifestations of BPH are not of a specific nature and very diverse, in connection with which there is disagreement about the interpretation of diagnostic tests.

For rapid and effective adoption of a number of decisions in medical clinical practice are increasingly being applied information and knowledge based software systems for data processing and expert analysis.

Thus, the available data shows that:

I. Symptoms various manifestations of BPH are not of a specific nature and very diverse, in connection with which there is disagreement about the interpretation of diagnostic tests.

II. Existing treatments BPH are diverse, the indications for their use are inconsistent and need for standardization of diagnostic on the basis of available medical knowledge.

III. Computer systems used in urology for the diagnosis and treatment selection of patients is small.

The proposed approach is the application of computer methods of provisional diagnosis patients. Computer information systems is now being successfully used to automate many aspects of human activity, such as to support the document and information processes. However, the use of computers in medicine is not limited by the subsidiary
accounting functions, and is connected with an attempt to automate the diagnosis and the involvement of computers directly in the process of treatment.

These questions determine the relevance of the problem at this stage, allowed to formulate the main purpose of the work and identify problems to deal with it.

To achieve results obtained from the research conducted were as follow:

a. Identify diagnostically-significant symptoms and signs of major diseases of the prostate, expression of which is a violation of urination;

b. Development of diagnostic and treatment system.

- Develop a common system structure and the allocation of principal components (the module of the provisional diagnosis, diagnostic tool and make recommendations for treatment);
- Development of knowledge based program for each stage of diagnosis for clinical groups of patients;

c. Implementing diagnostic and treatment system and its implementation in practice of urology. Introduction to the treatment process, integration into the workflow of the hospital;

The focus of this dissertation work is to develop the most appropriate method of treatment for each patient with urination disorders.
The study was conducted on the basis of clinical urology in two different hospitals in Republic of Ingushetia. To perform the tasks, the researcher carried out comprehensive studies of several patients with various types of urination disorders in the period from middle August to October 2009.

In the course of this dissertation work, the researcher developed and tested information and computer based program, allowing to carry out differential diagnosis of patients with various types of violations of urination.

The developed technique allows to train novice urologist with specific examples from the elaboration of the tactics of treatment of patients with various types of violations of urination.

Information and computer based program takes into account and monitor the process of treatment and if necessary, correct the treatment.

The methods of computer based program developed and applied a way of lessons for medical experience as a set of expert rules. From the work should be easy to use lessons learned from the involvement of the type of office equipment in the form of the application package and as part of other software components. Using the information developed by the computer based program is an effective way of intellectual support physician in urology multidisciplinary hospital or clinic, which allows training young professionals in the daily medical activity. Computer based programs are increasingly used in medicine for fast processing of information and effective decision making.
Using computer information systems cannot only solve the problem of integration of information about patients, but also participate directly in clinical processes. Computer based program can be applied in any field of medicine, including in urology through the development of information for each specific case.

Computer based program allows analyzing and identifying diagnostically significant symptoms and signs of underlying diseases of the prostate summarizing a set of symptoms and survey data to the differential diagnosis of various diseases of the prostate gland. Recommending the most appropriate method of treatment, depending on the specific situation, and to integrate all of the information system to a single software package and keep records of patients with an automatic developing solutions at all stages of patient examination.

Application of computer based program allowed the researcher to establish an accurate diagnosis and an acceptable form of treatment. The developed program and sufficient diagnostic accuracy show the applicability of the proposed approach to the problems of diagnosis of urological diseases.

The researcher applied a computer program can be useful when examining patients, whose diagnosis remains unclear after the initial inspection, or when a patient and physician decide to resort to invasive therapies. The researcher also believes that its use in the practice of beginning urologist will help carry out differential diagnosis of various types of violations of urination.

An important aspect of this program is that it disciplines the doctor and forces him to act in accordance with generally accepted scheme of diagnosis and treatment. This is
especially important for beginning professionals, which can simultaneously obtain background information.

Throughout the software development phase, problems were encountered and for the most part resolved. The program was evaluated to identify its strengths, limitations and possibilities for future enhancement.

The computer based program has a user friendly and consistent environment that is similar to other windows based applications. It incorporates a standard and systematic application design, using command buttons, drop down lists, text boxes and option buttons. Users who are used Windows based applications can adapt themselves very quickly to the program. Even those who are not used to Windows environment should be able to familiarize themselves quickly as the information is presented in a clear and concise manner.

There is a number of ideas for future enhancements, such as treatment process and some diagnostic. For example in diagnostics appropriate to add such as: Kidneys, Scrotum organs, Cystostomy and more Data from uroflometry (the average urine flow rate and volume of urine). As mentioned earlier, there should be global discussion about international standards of treatment and diagnostics chapters that the treatment and diagnostic various from different hospitals and doctors. However, time constrains prevented these ideas from being explored any further. It would be beneficial to add them in the future.