1.1 Background of Project

Benign Hyperplasia of Prostate (BHP) is the most widely spread benign neoplasm or tumor among elderly men. Through histological study, the dissemination rate of hyperplasia increases with age (Gardiner, 2006).

According to the data collected by different researchers from 13 to 50% of men suffer from this disease by the age of 60 and by the age of 90 about 90% of men have morphological changes peculiar to benign hyperplasia of prostate. In average half of such patients have macroscopic augmentation of prostate gland, and 25% of patients have clinical signs of prostatitis which need medical treatment (Kevin, 2004).

According to various estimates, every 4\textsuperscript{th} man on the earth will need medical treatment of hyperplasia of prostate by the age of 80 (Noble, et al., 2001). Symptoms of the various manifestations of BHP are dependent on many factors, that do not carry specific characteristics and they are quite manifold. That is why there are often disagreements among specialists in interpretation of diagnostic examination results (Jonathan & Kevin, 2008).

For efficient use of available diagnostic capabilities, as shown by data from the literature, it requires extensive experience and high qualifications of the doctor-urologist, which are formed for several years of practical work. This last condition makes it necessary to develop methods which would allow to generalizing and synthesizing the accumulated experience in this field and passing it to urologists who make daily decisions regarding tactics in treatment of patients suffering from
infravesical obstruction. This accumulated experience can be useful for polyclinic urologists and surgeons in making expert decisions regarding the need for in-patient treatment of out-patients suffering from infravesical obstruction.

Recently, there has been a vast increase in the use of computer technologies and applications for fast and effective decision making in medical, clinical practice. Expert decision and diagnostic systems contain experts’ knowledge represented in definite way so that doctors using these programs can draw up a preliminary diagnosis and recommendations for medical treatment.

At present, computer information systems are successfully used for automation of many aspects of human activities, for example document circulation and information process management. However the application of computers in medicine is not just limited to auxiliary, accounting functions but it is bonded to an attempt to automate the diagnosis process and make the actual medical treatment using computers (Bing, et al., 2007).

The above listed issues that define the current importance of the subject, at a present stage, helped me to formulate the main objective of the work and to lay down tasks to be completed in order to achieve goal.

1.2 Problem Statement

Benign prostatic hyperplasia (BPH) is the most common proliferative disease of the prostate of men around the world (Kirby, 2000). The symptoms of BPH are quite similar for every patient, and the treatment done based on symptoms discovered. The diagnostic for BPH is done by physicians and urologists, only a good experience urologist and physician will diagnose a patient with BPH disease in right way. This
experience acquired by urologists and physicians are based on many years of works. This knowledge gained by years of experience need to accumulate in one standard guideline (Giacomo, et al., 2006).

Usually, fresh graduates at the beginning are not confident in their decision in diagnostics and treatment. Thus, these standardized guidelines will help them in diagnosis of the patients and get more knowledge in short time. Improving diagnostics of patient with BPH using computer based program will be adequate solution in diagnostic and treatment of patient for clinical urologist and physician.

1.3 Research Objectives

The main objectives of this research are as follows:

- To study the current methods in diagnostic of BPH.
- To develop a program that more agile by improving diagnosis for patients with BPH.

The results obtained from the research conducted:

- To identify the predominant location in the prostate where BPH develops and describe how this fact relates to the symptoms and signs of BPH.
- To identify diagnostically significant symptoms and signs of the major prostate diseases, which are revealed through urine derangements.

1.4 Project Scope

The scope of this research concentrates on developing a computer based program for urologist and physician at clinics and hospitals, with standardized guidelines in improving diagnostics of patient for BPH.
The researcher will concentrate on diagnose granularity and other aspects of diagnosis of patient with BPH. The aim is to make the scope of the study more precise in order to provide a clear understanding of the specific subject.

1.5 Research Approach and Methodology

The researcher has chosen quantitative method for this research. However, interviews, survey questionnaire and review of literature are used as methods of data collection to build a clear picture about the diagnosis and treatments of patient with BPH. Therefore, the interviews from head physician of urological department from different hospitals, helped to reveal the main causes and criteria in diagnosis for BPH. At the same time, the survey questionnaire from different hospitals helped to examine the level of knowledge urologists and nurses, and the need of program in urology.

On the other hand, by reviewing of literature (journals, internet materials and books), the researcher seeks to find the current information on status of diagnosis and treatment of patient with BPH.

1.6 Significance of Research

Most of the clinics and hospitals focus on ensuring excellent services for the patients. However, one of the most efficient ways to provide excellent services comes from acquiring the knowledge. The production of the knowledge needs to be a major part of the overall production strategy.
One of the biggest challenges behind knowledge management is the dissemination of knowledge. People with the highest knowledge have the potential for high levels of value creation. But this knowledge can only create value if it is placed in the hands of those who must execute on it. Knowledge is usually difficult to access and expert knowledge acquired through training and research may disappear when the knowledge professional resigns. The only irreplaceable capital an organization possesses is knowledge and ability of its people. The productivity of that capital depends on how effectively people share their competence with those who can use it.

There is thus a need for clinics and hospitals to gather all relevant knowledge. This knowledge needs to be analyzed and disseminated through proper departments. The study undertaken is significant to the urological departments as well as for urologists and physicians.

1.7 Expected Outcome

The outcome of this project is to provide a computer based program that would fulfill the requirements of urologist and physician, deliver a program to diagnose and treat a patient with BHP in various ways as mention bellow. In which this program can be handled easily and users gain satisfaction through increased speed of data manipulation, automated processing, essential treatment outcomes, as well as reliable and user-friendly.

This program essentially provides an urologist to maintain a database of patients to their local computer, which includes patient’s information, symptoms and complaints, the diagnosis of the patient and medical history. The system helps to store the major types of data applicable to the diagnosis and treatments of patients with BPH in accordance
with the recommendations of the International Conciliation Committee on prostatic hyperplasia, such as:

1. Anamnesis;

2. Quantitative evaluation of severity of symptoms of IPSS and QOL;

3. Check the frequency (flow) and volume of urination;

4. Digital rectal examination;

5. Urine analysis;

6. Assessment of renal function on the level of creatinine in serum;

7. Analysis of PSA;

8. Uroflowmetry and quantifying of residual urine.

Computer based program’s assessment and diagnosis contain the urological knowledge of the medical expert (urologist), which allows doctors to perform in one degree or another formulation of the preliminary diagnosis and treatment recommendations.

Computer based program also focuses on the diagnosis of the patient in several stages, starting from the subjective symptoms of the patient (on the basis of symptoms revealed the assumed severity of the disease, without orienting the diagnosis), revealing diagnosis on the basis of test results and ending recommendations for treatment. In this case the first two phases (which are actually the most responsible and critical) conducted a numerical heuristic diagnosis, and only the final stage of developing recommendations for the treatment of the arguments used by classical methods of learning and decision making.

In the system of diagnosis at the first two stages (IPSS and QOL) is using value score, which is an indicator of the presence of symptoms. These scores are then summed over
all the symptoms, and the resulting numerical value is essentially an indicator of severity or the presence of the disease. This approach ignores the mutual influence of symptoms, but only their total weight. Another difficulty with this approach is the need to identify empirically weighting of individual symptoms, which is very complex and subjective task. Moreover, the coefficient matrix can vary depending, for example, from a regional or age-specific group of patients.

1.8 Organization of the Dissertation

The organizations of this thesis are as follows:

Chapter 1: Introduction

This chapter gives an overview of the research problem statements, research objectives, scope of the research, research approach and methodology, expected outcome and definition of terms

Chapter 2: Literature Review

This chapter discusses the related literature review that supports this study. Based on the literature review a theoretical framework is selected to assist the data collection. The literature review has helped in determining some of the accepted criteria in creating computer based program. Study of various conference and consensus papers around the world and as well as the latest consensus paper by the Malaysian Urological Association and the Prostate Health Council of Malaysia held in 1998.
Chapter 3: Research Methodology

This chapter explains the sampling method, the instrument for research, the research design, the research variables and the methods of the survey procedure and measurement.

Chapter 4: Data Analysis

This chapter presents the data analysis and the outcomes draw from the research. The outcomes are based on the results of the survey, interviews analysis of the collected data.

Chapter 5: Framework Adaption

This chapter discusses the chosen development framework that can be adapted in creating computer based program in improving diagnostic of patient with BPH.

Chapter 6: System Development

This chapter explains the program development methodology used to build a prototype of Computer Based Program based on the chosen development framework. The system overview, system objective, system scope, using the system development methodology, program interface design and implementation.

Chapter 7: Evaluation and Conclusion

This chapter provides a summary of the light of the research objectives, the limitation of this research and future work that can be expanded from this study.