



ORIGINAL ARTICLE

High Incidence of Severe Erectile Dysfunction in Benign Prostatic Hyperplasia Patients

Zuhirman^{1*}, Nur Rasyid², Yanwirasti³¹Department of Surgery, Urology Division, Faculty of Medicine, University of Riau, Pekanbaru, Indonesia²Department of Urology, Faculty of Medicine, University of Indonesia, Jakarta, Indonesia³Department of Anatomy, Faculty of Medicine, University of Andalas, Padang, Indonesia

ARTICLE INFO

doi: 10.5455/ijmr.20141205033220

Keywords:Benign Prostatic Hyperplasia,
Erectile Dysfunction,
Quality of Life,
Age*** Corresponding author:**¹Department of Surgery, Urology
Division, Faculty of Medicine,
University of Riau, Pekanbaru,
Indonesia
Email:
zuhirman.zamzami@yahoo.com

ABSTRACT

Introduction: Erectile Dysfunction (ED) and Benign Prostate Hypertrophy (BPH) are two health-related problems which are experienced by men aged over forty years. BPH and ED highly affect a man's quality of life (QoL). It is necessary to conduct research on the correlations between BPH and ED by using two kinds of valid scores, i.e. the International Prostate Symptoms Scores (IPSS) to determine the severity of BPH and the International Index of Erectile Function-5 (IIEF-5) to screen the existence of ED in BPH patients.

Objectives: The aim of this study is to identify the symptoms of BPH patients with ED and the correlations between ED and BPH by using IPSS, IIEF-5 and QoL.

Materials and Methods: This is a cross-sectional study which analyzes correlations between the severity of BPH and the severity ED by using IPSS and IIEF-5 in the Urology Clinic of Arifin Achmad Regional General Hospital.

Results: Sixty (60) subjects fulfilled the inclusion criteria. The highest incidence of ED is present in BPH patients in the age group of 60-69 years (38.3%). In this group, 90% of all BPH patients were diagnosed with ED. The degree of BPH and ED experienced by these patients are also mostly severe, namely 53.3% and 40% respectively. The QoL scores are also mostly unsatisfied (58.3%) with the Spearman test also showing that significant and strong correlations do exist between the severities of BPH and ED ($r = 0.836$, $p < 0.001$). Accordingly, a high incidence of ED on BPH patients is found and there are close correlations between the severities of BPH and ED, whereby if the severity of BPH increases, then the severity of ED will increase as well.

Conclusion: Due to a high incidence of ED in BPH patients, we need to be able to detect the occurrence of ED in BPH patients earlier so as to manage ED at an earlier stage.

INTRODUCTION

Erectile Dysfunction (ED), previously known as impotency, has become a common medical problem suffered by men undergoing the aging process. ED is defined as a man's inability to maintain enough penile erection to engage in satisfied sexual intercourse with his partner. Although the causes of ED vary, ED is said to may be caused by organic or psychogenic factors [1-2].

According to its etiology, ED may be caused by psychogenic, organic, drug abuse and surgery-related Eds [3-4]. ED highly impacts the Quality of Life (QoL) of both men and their partners and may cause severe psychological disturbances[2]. The prevalence of ED increases beginning over the age of forty. Several studies have also shown the correlation between ED incidences and Benign Prostatic Hyperplasia (BPH). The Cologne Male Survey has even indicated BPH as one of the ED risk factors[5].

The coinciding of ED in BPH is also a frequent disturbance suffered by men over the age of forty [5-6]. The histopathologic terminology of BPH describes hyperplasia of the stroma and epithelial cells on prostate glands. BPH will only become a clinical condition if several symptoms, known as Lower Urinary Tract Symptoms or LUTS [6], occur in patients.

A study in the United States by Olmsted Country found the prevalence of BPH to be nearly 13% for men over the age of forty, which percentage increases in line with the increase in age. BPH prevalences collected from various multicenter studies in Asia were also higher than those in the United States, namely around 18% in patients aged over forty [7]. Meanwhile, the prevalence of BPH in Indonesia is not yet completely known to this day.

BPH and ED are correlated diseases. The results of analytical studies on 198 related articles by Glina *et al* (2013) stated that based on strong epidemiological data, LUTS/BPH is a risk factor behind the occurrence of ED. The increase of adrenergic tones stimulates prostatic growth which results in partial obstruction of the bladder and in turn results in voiding and dysfunction of as well as disturbance in penile erectile functions. Arteriosclerosis may also result in unsatisfied voiding, urinary tract infection and cavernous body fibrosis which may stimulate LUTS/BPH and ED. The administering of the same drugs to treat LUTS/BPH and ED, namely phosphodiesterase-5 inhibitor (PDE-5i) and or α adrenergic receptor antagonist, also supported the fact that both clinical diseases are closely correlated [7].

To assess the severity of BPH, several scoring systems are used, one of which is the International Prostate Symptoms Score (IPSS) as adopted by the American Urological Association (AUA) [8]. To identify the occurrence of ED, on the other hand, an ED index known as the International Index of

Erectile Function-5 (IIEF-5) is used [9]. Most articles have also shown strong correlations between both of these valid instruments, whereby the worsening of voiding disfunctions also results in the worsening of erectile functions in men over the age of forty [5].

Besides the IPSS and IIEF-5 scores, the quality of life (QoL) index is also an important instrument in assessing all clinical effects of BPH patients. Most men only seek BPH treatment due to disturbances in their lives which influence their QoL. One question on QoL as issued by the International Consensus Committee is useful to assess the impact of BPH symptoms on the quality of life of BPH patients [10].

A study by Acebo *et al* (2000) showed that nearly 20% of male patients who participated in the study had mild and severe symptoms based on their IPSS scores, while 15% of them complained of unsatisfied urinary tarct functions which impacted their QoL. Most of their symptoms included fullness (filling), insomnia, complaints on emptying and complaints on the force and flow of urinary stream [11]. Strong and continuous contractions also resulted in anatomical changes in the bladder such as detrusor muscle hypertrophy, trabeculation and diverticle formations in the bladder. These structural changes in the bladder were felt by the patients as LUTS [9].

The prevalence of LUTS varies throughout Asian countries. In Singapore it is around 14% while in the Philippines, around 59%. It is also reported that mild to severe LUTS is prevalent in 36% of men between the ages of 50-59, 50% in 60-69 year olds and 60% in 70-79 year olds [12]. In addition, the study by Utomo *et al* (2012) in 100 BPH/LUTS patients found that 80% of them did not have libido, 17% did not engage in sexual intercourse, 45% had difficulties in reaching penile erection, 55% had difficulties in maintaining penile erection, 33% were unable to reach orgasm, 26% could not ejaculate and 41% were unsatisfied in sexual intercourse [13].

Based on the above facts, a study to assess correlations between BPH and ED is deemed beneficial. The aim of this study is to assess (i) the number of BPH patients based on age, severity of LUTS and severity of QoL, (ii) the incidence of ED in BPH patients and (iii) the correlation between BPH and ED. Based on the results of this study, it is hoped that we would be able to detect the occurrence of ED in BPH patients earlier so as to manage ED at an earlier stage.

MATERIALS AND METHODS

This study is analytical and cross-sectional in nature. The study was conducted in the Urology Clinic of Arifin Achmad Regional General Hospital, Pekanbaru, Riau Province, Indonesia from December 2013 up to January 2014. Approval on the study was

obtained from the Ethical Review Board for Medicine and Health Research, Faculty of Medicine of the University of Riau.

Informed consent was obtained from all patients prior to sample collection. The study population was BPH patients, and the samples were those of BPH patients who fulfilled the inclusive criteria. The amount of samples counted according to the snedecor-cochran formula was 57 with the following inclusive criteria: (1) the clinical BPH patients were based on the history of patients and their urologic physical examinations as confirmed by Digital Rectal Examinations, routine blood examinations, kidney functions as well as PSA and Transrectal Ultrasounds, (2) the consent of the patients to participate in the study. Exclusive criteria, on the other hand, were: (1) BPH patients undergoing medical BPH therapy, (2) BPH patients with histories of spine or pelvic trauma, surgery in urinary tract, stroke and diabetes, and disturbances in kidney and liver functions.

The data were collected from samples with IPSS, IIEF-5 and QoL scores. The severity of BPH symptoms was determined based on IPSS scores as approved by the World Health Organization (WHO). Each question in IPSS has a response which ranges from 0-5. The scores of the LUTS group consisted of three severities, namely mild symptoms (score of 0-7), moderate symptoms (score of 8-19) and severe symptoms (score of ≥ 20) [9-23].

The severity of ED was determined by the IIEF-5 scores. Such severity consisted of five levels, namely severe ED (score of 5-7), moderate ED (score of 8-11), mild to moderate ED (score of 12-16), mild ED (score of 17-21) & no ED (normal, score ≥ 22 [23]).

QoL is also an important component in assessing all clinical effects of BPH patients. QoL scores consisted of delighted (score of 0), pleased (score of 1), mostly satisfied (score of 2), satisfied-unsatisfied (score of 3), mostly dissatisfied (score of 4), unhappy (score of 5) and terrible (score of 6) [10]. The results of the study were analyzed by using a computer programme.

RESULTS

Sixty (60) samples fulfilled the inclusive criteria. Table 1 showed BPH patients aged 44-88 years, with the most patients coming from the age group of 60-69 which constituted 38.3%.

Table 2 showed that most BPH patients had severe IPSS, namely 53.3% while it also showed that 40% BPH patients suffered from severe ED. Table 3 showed that a majority of BPH patients fell under the "mostly dissatisfied" category (58.3%).

To assess correlations between BPH and ED, the Pearson correlation test was used in the parametric test. Due to an uneven distribution of data in this study, the Spearman correlation test was used.

Table 1. Distribution of BPH patients according to age

Age (in years)	Patients (n=60) (%)
40-49	5 (8.3)
50-59	11 (18.3)
60-69	23 (38.3)
70-79	17 (28.3)
80-89	4 (6.7)
Mean (Range) in years	64.60 (44 – 88)

Table 2. Distribution of BPH patients according to IPSS severity and ED severity

Patients (n=60) (%)	
Severity of BPH	
Mild (0-7)	5 (8.3)
Moderate (8-19)	23 (38.3)
Severe (≥ 20)	32 (53.3)
Mean (Range)	19.30 (6-29)
ED severity	
Normal (≥ 22)	6 (10)
Mild (17-21)	5 (8.3)
Mild-Moderate (12-16)	12 (20)
Moderate (8-11)	13 (21.7)
Severe (5-7)	24 (40)
Mean (Range)	10.87 (5-23)

Table 3. Distribution of BPH patients according to QoL severity

QoL severity	Patients (n=60) (%)
Delighted (0)	0
Pleased(1)	0
Mostly satisfied (2)	0
Satisfied-unsatisfied(3)	5 (8.3)
Mostly dissatisfied (4)	35 (58.3)
Unhappy(5)	17 (28.3)
Terrible (6)	3 (5)
Mean (Range)	4.30 (3-6)

Based on hypothetical test results on correlations between BPH and ED (parametric), the Significance value was 0.000 which indicated that correlations between the IPSS score and the IIEF-5 score were significant (whereby $p < 0.05$). The Spearman correlation test score of 0.892 showed highly strong correlations and a negative correlation direction, whereby the higher the IPSS score is, the lower the IIEF-5 score becomes.

To assess correlations between BPH severity and ED severity, the Spearman correlation test was used in the non-parametric test. Based on hypothetical test results on correlations between BPH and ED (non-parametric), the Significance value was 0.000 which indicated that correlations between the IPSS score and the IIEF-5 score were significant (whereby $p < 0.05$). The Spearman correlation test score of 0.836 showed highly strong correlations and a positive correlation direction, whereby the higher the BPH

severity score is, the lower the ED severity score becomes.

DISCUSSION

BPH is a benign prostate tumor which is frequently found in men [14-15]. Age is a condition highly correlated to BPH, whereby the incidence of BPH will increase in line with the increase in age [15].

Sixty (60) BPH outpatients in our urology clinic participating in the study were from a mean age of 64.60 within an age range of 44-88 years. This is in line with the studies of Ikuerowo *et al* (2008) in Nigeria whereby the mean age was 64.8 within an age range of 46-84 years, and the studies of Glina *et al* (2006) in Brazil, whereby the mean age was 61.7 within an age range of 45-82 years [16-17]. This study is also not too entirely different from the study of Shao *et al* (2005) in China whereby the mean age was 67.90 and the study of Minana *et al* (2013) in Spain whereby the mean age was 65.7 [18-19].

The 5 patients in the age group 40 - 49 year consisted of one patient in the age of 44 year, two patients in the age of 46 year, one patient in the age of 47 year and one patient in the age of 49 year. There was no any patient bellow the age 44 year. The 40-49 year was only one of the group distribution as showed in the table 1. All of the five patients were proved clinical BPH patients according to the age, history, urologic physical examinations, urine and routine blood examinations, PSA and Transrectal Ultrasound examinations.

The BPH patients were mostly 60-69 years of age (38.8%) and followed by 70-79 year olds (28.3%). The study by Ozayar *et al* (2008) showed that the mean age was 66.5 within the age range of 50-89 years, with most falling within the age range of 70-79 years (38%) followed by 60-69 year olds (30%) [20]. The causes of lesser samples for the age group of 70-79 years and 80-89 years than those for the age of 60-69 years in this study are that there may be less patients over 79 years of age, or that visits by outpatients within the ages of 70-79 and 80-89 were lesser than those of outpatients within the ages of 60-69 [21].

A previous study at our Hospital by Sabri (2011) showed that most BPH patients (37.3%) were 70-79 years of age, followed by 60-69 year olds (30.30%). This study was different from ours due to Sabri's samples having been collected from BPH patients who underwent TURP [22].

The frequency distribution of BPH patients according to BPH severity by using their IPSS scores in our urology clinic showed that severe IPSS was mostly prevalent (53.3%) with an average IPSS score of 19.30. This result is not too far different from the study of Morales *et al* (2001) who found an average IPSS score of 19.20, and the study of Shao *et al* (2008) who found an average IPSS score of 18.4 [18-24]. This study is also in line with the study of Utomo *et*

al (2012) who showed that BPH severity was mostly (56%) severe with an average IPSS score of 19.69 [22]. The phenomenon of high incidence of severe IPSS in BPH patients may be caused by patients only seeking medical help upon experiencing disturbing symptoms. Most BPH patients found in our urology clinic were therefore those with severe symptoms [1].

The frequency distribution of BPH patients suffering from ED by using IIEF-5 in our urology clinic showed that nearly all (90%) BPH patients suffered from ED and that all 40% had severe ED with a mean IIEF-5 score of 10.87. This result is not too far different from the study of Morales *et al* (2001) which found that nearly all (86.36%) of BPH patients suffered from ED with a mean IIEF-5 score of 8.50 [23]. This study is also in line with the study of Shao *et al* (2008) which found that the average IEF-5 score was 8,5 [18-24]. The results of our study are also not too different from the study of Ozayar *et al* (2008), who found that the BPH patients who suffered from severe ED constituted 36% of the entire BPH patients tested [18-20].

The Multinational Survey of the Aging Male (MSAM-7) reported that ED may increase significantly in line with the severity of symptoms of BPH patients. Since the BPH patients who sought medical help mostly had mild to severe symptoms, this tended to result in a decrease in IIEF-5 scores in more severe cases of ED [24].

The frequency distribution of BPH patients according to the quality of life (QoL) scores in our urology clinic has shown that 53.3% of the patients felt unsatisfied with an average QoL score of 3.7, when the study of Bertaccini *et al* (2001) found an average QoL score of $3.0 \pm 1,4$ [25]. The study by Minana *et al* (2013) in Spain also found that most (42.7%) BPH patients had QoL scores which fall under the unsatisfied category [19].

Most BPH patients sought for help only after the symptoms became bothersome and had a negative impact on their QoL [10]. Many studies have stated that the ED is correlated to BPH. Many articles have also shown high correlations between IPSS and IIEF-5, whereby a worsening of voiding disturbance or a worsening of erectile functions would take place in men over 40 years of age [5].

Hypothetical tests which assess correlations between IPSS scores and IIEF-5 scores by using the Spearman correlation test found highly significant correlations ($p = 0.000$) between both the correlation power of (r) 0.892 and a negative correlation direction. This means the higher the IPSS score, the lesser the IIEF-5 score will become. Moreover, correlations between BPH severity and ED severity by using the Spearman correlation test found highly significant correlations ($p < 0.05$) between both the correlation power of (r) 0.836 and a positive

correlation direction. This means the higher the BPH severity, the higher the ED severity will become.

Our study has supported the previous study of Utomo *et al* (2012) who found highly significant correlations ($p = 0.000$) between BPH and ED with a correlation power of (r) 0.983, and the study of Ozayar *et al* (2008) by using the Spearman correlation test which found highly significant correlations ($p < 0.001$) between BPH and ED with a correlation power of (r) 0.621 and a negative correlation direction between IPSS scores and the IIEF-5 score of 1 [13-20]. Our study is also in line with the study of Morales *et al* (2001) which found a significant correlation ($p < 0.05$) between the IPSS score and the IIEF-5 score of 1 in BPH patients [24]. The study by Glina *et al* (2006) in Brazil also found a significant negative correlation ($p < 0.001$) between the IPSS score and the IIEF-5 score of 1 in BPH patients [17].

Many studies on correlations between BPH and ED in BPH patients and this study have proven the existence of highly significant correlations. In the studies, the incidence of ED in BPH patients was low and was not too far different from one another. In our study, we found a high incidence of ED in BPH patients with highly significant correlations, and most of the tested patients had severe ED which disturbed them. In our observations during this study, the BPH patients also almost never talked about the disturbances from their severe ED at the time of their visits due to unknown reasons. Earlier screening to detect the existence of ED in BPH patients seeking for help and the early management of ED in the overall management of BPH should be done in order to improve the QoL of patients.

Due to findings in this study on the high incidence of ED in BPH patients, we suggest that further comprehensive studies be held on the causes or factors which influence the coinciding between ED and BPH in pathobiological work.

REFERENCES

- Edward David Kim. Erectile Dysfunction. Medscape Medical News [online series], September 2013 [quoted on 12 October 2013]. Accessed from: <http://emedicine.medscape.com/article/444220-overview>
- Paul Arduca, GradDipVen. Erectile Dysfunction: A Guide to Diagnosis and Management. Middle East Journal of Family Medicine. 2004; 4(4).
- Auanet.org [internet homepage]. Erectile Dysfunction (ED). New York: American Urological Association [quoted on 11 November 2013]. Accessed from <http://www.auanet.org/common/pdf/education/ED.pdf>
- Stephanie M Meller, Erik Stilp, Charles N. Walker, Carlos Mena-Hurtado. The Link between Vascuogenic Erectile Dysfunction, Coronary Artery Disease and Peripheral Artery Disease: Role of Metabolic Factors and Endovascular Therapy. Journal of Invasive Cardiology. 2013; 25(6): 313-19.
- Sidney Glina, Felipe Glina. Pathogenic Mechanisms Linking Benign Prostatic Hyperplasia, Lower Urinary Tract Symptoms and Erectile Dysfunction. Therapeutic Advances in Urology. 2013; 5(4): 211-218.
- Claus G Roehrborn. Benign Prostatic Hyperplasia: An Overview. Reviews in Urology. 2005; 7 Suppl 9: S3-14.
- J. de la Rosette, G. Alivizatos, S. Madersbacher, C. Rioja Sanz, J. Nordling, M. Emberton, S. Gravas, MC Michel, M. Oelke. Guidelines on Benign Prostatic Hyperplasia. European Association of Urology. 2006: 5.
- Matthew BG, Alan W. Partin, David YC. Lower Urinary Tract Symptoms (LUTS) and Benign Prostatic Hyperplasia (BPH). Robert G. Moore, Jay T. Bishoff, Stefan Loenig, Steven G. Docimo, eds. in Minimally Invasive Urological Surgery. USA: Taylor and Francis Group plc; 2005, p. 545.
- Joseph J. P., Christopher J. K., Katsuto S., Peter R. C. Neoplasms of the Prostate Gland: Emil Tanagho, Jack WM as editors. Smith's General Urology, Seventeenth Ed. USA: The McGraw-Hill Companies, Inc; 2008. 384-55.
- Alan J. Wein, David Lee. Benign Prostatic Hyperplasia and Related Entities. Philip M. Hanno, Alan J. Wein, Bruce Malkowicz, eds. Penn Clinical Manual of Urology. Philadelphia: Elsevier Inc; 2007, p. 483-504.
- Gómez Acebo, Rodríguez Vallejo JM, Rodríguez Mora VI, García Alcázar. Quality of Life and Symptomatology in Benign Prostate Hyperplasia in Active Spanish Population. Medicina Clínica. 2000; 114 (3): 81-9.
- MK Li, Garcia LA, Rosen R. Lower Urinary Tract Symptoms and Male Sexual Dysfunction in Asia: A Survey of Ageing Men from Five Asian Countries. BJU International. 2005; 96(9): 1339-54.
- Nugroho Budi Utomo, Ponco Birowo, Nur Rasyid, Akmal Taher. Erectile Dysfunction in Benign Prostatic Hyperplasia with Lower Urinary Tract Symptoms. Indonesian Journal of Surgery. 2012; 39-40 (1-2): 13-15.
- Michael J Barry, Mary McNaughton-Collins. Benign Prostate Disease and Prostatitis. Lee Goldmen, Dennis Ausiello as editors. Cecil Medicine 23rd ed. Philadelphia: Elseviers Saunders; 2007.
- Horchani A., Binous MY, Ben Hamida A., Sallami S., El Adbi H., Naji A. Prevalence of Benign Prostatic Hyperplasia in General Practice and Practical Approach of the Tunisian General Practitioner (Prevapt study). Tunis Med. 2007 Aug; 85(8): 619-24.
- Ikurowo SO, Akindiji YO, Akinoso OA, Akinlusi FM, Esho JO. Association between Erectile Dysfunction and Lower Urinary Tract Symptoms due to Benign Prostatic Hyperplasia in Nigerian Men. Urol Internation. 2008; 80(3): 296-9.
- Sidney Glina, Antonio Santana, Flavio Azank, Luiz Mello and Edson Moreira. Lower Urinary Tract Symptoms and Erectile Dysfunction are Highly Prevalent in Ageing Man. BJU International. 2006; 97(4): 763-765.
- Shao Q., Song J., Guo YW, Lu WC, Du LD. Evaluation of Sexual Function in Men with Symptomatic Benign Prostatic Hyperplasia. National Journal of Andrology. 2005; 11(7): 505-507.
- Minana, Antolin, Prieto, Pedrosa. Severity Profiles in Patients Diagnosed of Benign Prostatic Hyperplasia in Spain. Actas Urol Esp. 2013.
- Asim Ozayar, Ali Zumurbas, Onder Yaman. The Relationship between Lower Urinary Tract Symptoms, Diagnostic Indicators of Benign Prostate Hyperplasia (BPH) and Erectile Dysfunction in Patients with Moderate to Severely Symptomatic BPH. Int Urol Nephrol. 2008; 40: 933-939.
- Dianika RA. Correlation between the Incidence of Leucosuturia and Prostate Volume in Benign Prostate Hyperplasia with Ultrasound Examination. [scripton].

- Surakarta: Faculty of Medicine, University Sebelas Maret, Indonesia;2010.
22. Sabri M. The Description of Benign Prostatic Hyperplasia Patients Underwent Transurethral Resection of the Prostate in Arifin Achmad Regional General Hospital, Riau Province, in January 2009 – December 2010 [scription]. Pekanbaru: Faculty of Medicine, University of Riau, Indonesia; 2011.
23. Morales Heaton. Hormonal Erectile Dysfunction: Evaluation and Management. *Urol Clin North Am.* 2001; 28:279–288.
24. Rosen R, Altwein J, Boyle P, et al. Lower Urinary Tract Symptoms and Male Sexual Dysfunction: The Multinational Survey of the Aging Male (MSAM-7). *Eur Urol.* 2003; 44:637–49.
25. Bertaccini A., Vassallo F., Martino F., Luzzi L., Rocca Rossetti, Di Silverio, Comunale L. Symptoms, Bothersomeness and Quality of Life in Patients with LUTS Suggestive of BPH. *Eur Urol* 2001;40(suppl 1): 13–18.