

## Severe Symptoms of Benign Prostatic Hyperplasia: Prevalence, Associated Factors and Effects on Quality Of Life of Rural Dwelling Elderly

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**Abstract:** Benign prostatic hyperplasia (BPH) is common among elderly men and affects their quality of life. This study aims to describe the symptoms of BPH and its associated factors to determine their effects on quality of life (QoL) of elderly men. Four hundred twenty elderly living in two villages in Mansoura, Egypt were interviewed at their homes. Data collected included socio-demographics, clinical data, International Prostate Symptom Score (IPSS) and WHO Quality of life-brief (WHOQOL-BREF) scale. The median score of IPSS is 14 and 26.9% of elderly reported severe symptoms of BPH. The logistic regression revealed that the independent predictors of severe prostatic symptoms were being widow/divorced, coronary heart disease, renal disease and diabetes mellitus. The mean scores of the four domains of quality of life showed significant downward trend with categories of BPH symptoms. Raising awareness and timely consultation and treatment could contribute to the improvement of QoL of elderly men.

**Keywords:** Elderly men, quality of life, benign prostate hyperplasia, voiding symptoms, storage symptoms, Egypt.

### I. Introduction

Benign Prostate Hyperplasia (BPH) is characterized by the Lower Urinary Tract Symptoms (LUTS) like urinary hesitancy, intermittency, weak urinary stream, nocturia, increased frequency, urgency and the sensation of incomplete bladder emptying.<sup>1</sup>LUTS are highly prevalent among older population<sup>2, 3</sup>. The prevalence of moderate-to-severe LUTS ranged from 50% up to 90% by the eighth decade of life<sup>4,5</sup>. Approximately 50% of men who have BPH develop moderate to severe symptoms.<sup>6</sup>

Although BPH is not a life threatening disease, it affects individual's quality of life (QoL) in different ways. The impairment in QoL of BPH patients is mainly because of sleep disturbance due to nocturia, disruption of social life due to urinary frequency, psychological burden due to urgency, inadequate sex life, and fear of prostate cancer.<sup>11</sup>

LUTS significantly affect the QoL of the patients with BPH<sup>1</sup>.Research showed that a greater International Prostate Symptom score (IPSS) is strongly associated with reduced QoL.<sup>8,9</sup> Many studies found that storage symptoms may contribute to this reduced QoL to a greater extent than voiding symptoms.<sup>10-14</sup>Few studies reported a stronger association of voiding than storage symptoms with reduced QoL.<sup>15</sup>

To the best authors' knowledge, there were no community-based studies in Egypt on the magnitude of the problems of BPH symptoms among elderly men and related effects on their quality of life. This study aimed at estimating the prevalence of severe symptoms of BPH and its associated factors and at determining their effects on QoL of elderly men living in rural communities. The study hypothesis was that severe prostatic symptoms are prevalent among elderly men and impair their QoL.

### II. Subjects And Method

This descriptive cross-sectional design was carried out in two villages of Mansoura District, Dakahlia Governorate, Egypt, during the period from September 2015 to February 2016. The target population included elderly men living in the selected villages and fulfilling the following criteria as they: aged 60 years and above, were able to communicate and accepted to participate in the study. Elderly diagnosed with prostate cancer, underwent prostatectomy, having neurologic diseases, or taking drugs affecting lower urinary tract functions were excluded.

The Sample size was calculated using SPSS sample calculator with the following assumption: The pilot study revealed that 23.1% of old men have severe prostatic symptoms. With alpha error of 5%, study power 80% and the effect size of 5, then the expected sample size is 414 at least. Two villages (Al Baramon and Met-khames villages) out of seventy-two in Mansoura District were selected (one North and one South to Mansoura city), both villages have the largest number of elderly men. Total sample was distributed proportionally according to total number of elderly in each village. According to the family files of the Family Health Units of

the two villages, the number of elderly was 1356 and 893 in both villages; respectively. Within every village systematic random sample (one every fifth of elderly was selected). Four hundred and fifty elderly were invited to participate in the study. However, 420 of them (93.3%) completed the questionnaire. The others were either not fulfilling the inclusion criteria (19, 4.2%) or not interested in the study (11, 2.4%). Social worker affiliated to the Family Health Unit arranged for home visit on a mutually agreed day. The researchers completed the questionnaire through a direct interview with the elderly during home visits.

A pilot study was carried out on a sample of 20 elderly (10 from each village and not included in the full-scale study) to evaluate the applicability, clarity and feasibility of the developed tools and to estimate the prevalence of severe prostatic symptoms for sample size calculation.

**Tools:** The study questionnaire included three parts: (1) **socio-demographic data** (e.g. age, marital status, education, current work and income) and medical history of chronic diseases (e.g. heart diseases, hypertension diabetes mellitus, renal diseases, etc.). (2) **The Arabic version of International Prostate Symptom Score (IPSS)** translated and validated by Hammad and Kaya (2010)<sup>15</sup>. IPSS is based on the answers to seven questions concerning urinary storage symptoms (frequency, urgency and nocturia) and voiding symptoms (hesitancy, week stream, intermittent and incomplete voiding). Each question can be answered on a scale of 0 to 5 (ranging from not at all to almost always). The total score can therefore range from 0 to 35 (asymptomatic to very symptomatic). The IPSS is categorized into mild (symptom score less than or equal to 7), moderate (symptom score range 8-19) and severe (symptom score range 20-35) (Barry et al, 1992)<sup>16</sup>. (3) **The Arabic version of the World Health Organization quality of life brief (WHOQOL-BREF) instrument.** (WHO, 2004)<sup>17</sup>, and translated into Arabic and tested for its validity and reliability by **Ahmed (2008)**<sup>18</sup>. The reliability was assured by spearman's correlation coefficient  $r=0.884$ . It is used to assess the individual's perceptions in the context of their culture and value systems, and their personal goals, standards and concerns. The WHOQOL-BREF produced a profile with four domain scores (physical health, psychological health, social relationship and environment). It contains 26 questions. Scoring of the items is made using a 5-point Likert's scale ranging from one (1) to five (5). The four domain scores are scaled in apposite direction with higher scores indicating a higher quality of life.

#### **Ethical Considerations:**

The study was approved the Research Ethics Committee of the Faculty of Nursing, Mansoura University. Verbal consent was obtained from the study participants after explanation the purpose of the study. They were assured about the confidentiality and anonymity of the collected data. The privacy of each elderly was maintained and their rights to withdraw from the study any time without penalties.

Data was analyzed using SPSS version 21. Qualitative variables were described as number and percent. Pearson's  $\chi^2$  was used for comparison between groups and unadjusted OR and their 95% CI were calculated. Significant associated factors were entered into a regression model using forward Wald method to detect the independent predictor of sever prostatic symptoms. Adjusted OR and their 95% CI were calculated. Quantitative variables were presented as mean  $\pm$  SD. ANOVA (F) test was used for comparison more than two means with Bonferroni's post-hoc multiple comparison test. Spearman's correlation coefficient ( $r$ ) was used to calculate correlation between different IPSS scores and the scores of the four domains of QoL. Multivariate linear regression with voiding and storage symptoms as independent variables and the score of each domain of QoL as dependent variable. Coefficient of determination ( $R^2$ ) was calculated for each model.  $P \leq 0.05$  was considered statistically significant.

### **III. Results**

**Table 1** shows that the median scores of the voiding and storage were 8 and 7; respectively. The median score of IPSS is 14 and 26.9% of elderly reported severe symptoms of BPH. Only 16.0% of elderly consulted physicians for the symptoms.

**Table 2** shows that the severe BPH symptoms were significantly more among widow/divorced (OR=4.1), coronary heart disease (OR=4.9), hypertension (OR=2.5), renal diseases (OR=4.9), diabetes mellitus (OR=7.7) and musculoskeletal diseases (OR=2.3). The logistic regression revealed that the independent predictors of severe prostatic symptoms were widow/divorced (AOR=4.5; CI= 2.4-8.6), coronary heart disease (AOR=6.3; CI= 3.5-11.2), renal disease (AOR=5.2; CI= 2.5-10.8) and diabetes mellitus (AOR=4.0; CI= 2.1-7.6) (**table 3**). The mean scores of the four domains of quality of life show significant downward trend with categories of BPH symptoms (**table 4**).

**Table (5)** reveals that the scores of voiding symptoms, storage symptoms and the total IPSS are inversely significantly correlated with the scores four domains of QoL with correlation coefficient ranging from -0.3 to -0. Multivariate linear regression with voiding and storage symptoms as independent variables and the score of each domain of QoL as dependent variable revealed that the storage symptoms score is the independent

predictors of QoL scales. The coefficient of determination ( $R^2$ ) was 0.21, 0.12, 0.12 and 0.18 for the physical health, psychological health, social relationships and environmental domains; respectively (data not shown in tables).

**Table 1:** Symptoms of benign prostate hyperplasia (BPH) among 420 elderly.

Items	N (%)	Mean ± SD	Median (Min – max)
<b>Storage symptoms<sup>#</sup>:</b>		6.8±3.1	7(0-15)
Frequency		2.1±1.3	2(0-5)
Nocturia		1.8±1.3	2(0-5)
Urgency		2.9±1.3	3(0-5)
<b>Voiding symptoms<sup>#</sup>:</b>		8.4±4.4	8(0-19)
Incomplete emptying		2.4±1.5	2(0-5)
Intermittency		2.1±1.6	2(0-5)
Weak stream		2.4±1.4	2(0-5)
Straining		1.6±1.4	1(0-5)
<b>BPH symptoms<sup>##</sup></b>		15.2±7.1	14.0(0-33)
Mild symptoms (<7)	51(12.1)		
Moderate symptoms (8-19)	256(61.0)		
Severe symptoms (20-35)	113(26.9)		
<b>Consultation for symptoms.</b>	67(16.0)		

<sup>#</sup> More than one response

<sup>##</sup> According to IPSS score

**Table 2:** Prevalence of severe prostatic symptoms and its variation according sociodemographic characteristics and associated morbidities.

	Total	Severe symptoms	P	OR (95% CI)
Overall	420(100)	113(26.9)		
Age (years): 60-	272(4.8)	67(24.6)		1(r)
65-	94(22.4)	27(28.7)	0.4	1.2(0.7-2.1)
70-	54(12.9)	19(35.2)	0.1	1.6(0.9-3.1)
Marital status: Married	348(82.9)	75(21.6)		1(r)
Widow/divorced	72(17.1)	38(52.8)	≤0.001	4.1(2.4-6.9)
Level of education:				
Illiterate	136(32.4)	36(26.5)		1(r)
Read & write	109(26.0)	35(32.1)	0.3	1.3(0.8-2.3)
Basic and secondary	133(31.7)	33(24.8)	0.8	0.9(0.5-1.6)
University	42(10.0)	9(21.4)	0.5	0.8(0.3-1.7)
Current work: Yes	97(23.1)	23(23.4)		1(r)
No	323(76.9)	90(27.9)	0.4	1.2(0.7-1.6)
Income: Enough	157(37.4)	42(26.8)		1(r)
Not enough	263(62.6)	71(27.0)	0.96	1.0(0.6-1.6)
Coronary heart disease:				
No	285(67.9)	48(16.8)		1(r)
Yes	135(32.1)	65(48.1)	≤0.001	4.9(2.9-7.3)
Hypertension: No	261(62.1)	52(19.4)		1(r)
Yes	159(37.9)	61(38.4)	≤0.001	2.5(1.6-3.9)
Renal Disease: No	361(85.9)	79(21.9)		1(r)
Yes	59(14.0)	34(57.6)	≤0.001	4.9(2.8-8.7)
GIT diseases: No	257(61.2)	77(30.0)		1(r)
Yes	163(38.8)	36(22.1)	0.08	0.7(0.4-1.0)
Diabetes mellitus: No	347(82.6)	66(19.0)		1(r)
Yes	73(17.4)	47(64.4)	≤0.001	7.7(4.4-13.2)
Respiratory diseases:				
No	372(88.6)	96(25.8)		1(r)
Yes	48(11.4)	17(35.4)	0.2	1.6(0.8-3.0)
Eye diseases: No	374(89.0)	107(28.6)		1(r)
Yes	46(10.9)	6(13.0)	0.025	0.4(0.2-0.9)
Musculoskeletal diseases:				
No	301(71.6)	66(21.9)		1(r)
Yes	119(28.3)	47(39.5)	≤0.001	2.3(1.5-3.7)

OR=Odds ratio, CI=Confidence interval, r=reference group, GIT Gastro-intestinal

**Table 3:** Logistic regression analysis of independent predictors of severe prostatic symptoms.

	β	P	AOR (95%CI)
Marital status: Married	-		1(r)
Widowed/divorced	1.5	≤0.001	4.5(2.4-8.6)
Coronary heart disease: No	-		1(r)
Yes	1.8	≤0.001	6.3(3.5-11.2)
Renal Disease: No	-		1(r)

Yes	1.7	≤0.001	5.2(2.5-10.8)
Diabetes mellitus: No	-		1(r)
Yes	1.4	≤0.001	4.0(2.1-7.6)
Constant	-2.8		
Model $\chi^2$	134.4, P≤0.001		
% correctly predicted	79.3		

AOR=Adjusted Odds Ratio, CI=Confidence Interval, r=reference group

**Table 4:** Quality of life domains and IPSS categories

IPSS categories	Quality of life domains			
	Physical health Mean±SD	Psychological health Mean±SD	Social relationships Mean±SD	Environment Mean±SD
Mild symptoms	26.6±3.7 <sup>AB</sup>	20.2±3.2 <sup>AB</sup>	12.4±1.4 <sup>AB</sup>	28.7±3.2 <sup>AB</sup>
Moderate symptoms	22.5±5.7 <sup>AC</sup>	18.0±3.5 <sup>AC</sup>	11.2±2.3 <sup>AC</sup>	24.2±5.2 <sup>AC</sup>
Severe symptoms	19.5±4.2 <sup>BC</sup>	16.2±3.2 <sup>BC</sup>	10.1±2.4 <sup>BC</sup>	20.9±5.3 <sup>BC</sup>
Significance	F=34.4, P≤0.001	F=26.05, P≤0.001	F=20.7, P≤0.001	F=43.7, P≤0.001

A, B & C significant differences between the corresponding group by post-hoc Bonferroni's post-hoc multiple comparisons.

**Table 5:** Correlation between QoL domains scores and score of voiding symptoms, storage symptoms and total IPSS

IPSS score	Quality of life domains			
	Physical health r	Psychological r	Social relationships r	Environment r
<b>Storage symptoms</b>	<b>-0.5<sup>***</sup></b>	<b>-0.4<sup>***</sup></b>	<b>-0.4<sup>***</sup></b>	<b>-0.5<sup>***</sup></b>
Frequency	-0.2 <sup>***</sup>	-0.2 <sup>***</sup>	-0.15 <sup>**</sup>	-0.2 <sup>***</sup>
Nocturia	-0.4 <sup>***</sup>	-0.3 <sup>***</sup>	-0.3 <sup>***</sup>	-0.4 <sup>***</sup>
Urgency	-0.6 <sup>***</sup>	-0.4 <sup>***</sup>	-0.5 <sup>***</sup>	-0.5 <sup>***</sup>
<b>Voiding symptoms</b>	<b>-0.4<sup>***</sup></b>	<b>-0.3<sup>***</sup></b>	<b>-0.4<sup>***</sup></b>	<b>-0.4<sup>***</sup></b>
Incomplete emptying	-0.14 <sup>**</sup>	-0.2 <sup>***</sup>	-0.13 <sup>**</sup>	-0.14 <sup>**</sup>
Intermittency	-0.3 <sup>***</sup>	-0.2 <sup>***</sup>	-0.18 <sup>**</sup>	-0.2 <sup>***</sup>
Weak stream	-0.3 <sup>***</sup>	-0.2 <sup>***</sup>	-0.2 <sup>***</sup>	-0.33 <sup>***</sup>
Straining	-0.3 <sup>***</sup>	-0.3 <sup>***</sup>	-0.2 <sup>***</sup>	-0.3 <sup>***</sup>
<b>Total IPSS</b>	<b>-0.5<sup>***</sup></b>	<b>-0.4<sup>***</sup></b>	<b>-0.4<sup>***</sup></b>	<b>-0.5<sup>***</sup></b>

\*\* \*\*\* Significant at P≤0.01 and 0.001; respectively

#### IV. Discussion

The mean IPSS score was 15.2±7.1. This was comparable to 14.67 ±5.95, reported in rural Korea.<sup>20</sup> This study revealed that the mean scores of weak urinary stream, incomplete emptying, urgency and nocturia were 2.4, 2.4, 2.9 and 1.8; respectively. These show slight variation than 3.37, 2.43, 2.19 and 2.05; respectively reported in rural Korea.<sup>20</sup>

This study supports the hypothesis of the high prevalence of severe prostatic symptoms. It revealed that 61.0% and 26.9% had moderate and severe BPH- symptoms; respectively. Different proportions were reported in previous studies. In Sudan: the moderate and severe BPH-symptoms accounted for 46.9% and 44.0%; respectively.<sup>21</sup> In rural Korea: 20% of elderly have moderate and severe PBH symptoms,<sup>20,22</sup> the corresponding percentages in urban areas: 25.5% and 40%.<sup>23,24</sup> A Danish study also reported that 25% of moderate & severe PBH symptoms among all men.<sup>25</sup>

In USA, the prevalence of diagnosed BPH among men over 50 years in the community was 13.5%.<sup>6</sup> It was estimated that the incidence of BPH increases by 10% per decade.<sup>26,27</sup> These differences in mean total IPSS and its sub-scores as well as the prevalence rates may be explained by differences in inclusion/exclusion criteria, operational definition of BPH and methodologies. The diagnosis of BPH relies almost entirely on patient reporting and complaints of LUTS. Such a diagnosis is highly subjective and hence susceptible to various forms of reporting bias possibly rooted in sociocultural differences in symptoms perception or the willingness of patients to report urinary symptoms.<sup>28</sup>

Despite the high prevalence of severe symptoms among the targeted elderly, only 16% of them seek medical advice. In Korea, 42.7% of community-dwelling elderly with BPH had never consulted with any one about their symptoms.<sup>22</sup> This may be attributed to the subjective interpretation of symptoms that may be considered as a physiologic aging process that affect all elderly. Health-seeking behavior is influenced by symptoms severity, particularly if these symptoms interfere with daily activities. Severity of urinary symptoms is a vital determinant of health care-seeking behavior.<sup>29</sup> Masumori et al.<sup>30</sup> concluded that voiding symptoms may influence health care-seeking behavior through QoL impairment. The most important motivations for seeking treatment were the severity and the degree of bother associated with the symptoms.<sup>31</sup> Some elderly men may

believe that urinary symptoms and sexual dysfunction are normal parts of aging. Other may be embarrassed about discussing these problems with health care providers and prefer watchful waiting.<sup>32</sup>

Age and genetics play an important role as causes of BPH<sup>29</sup> and familial inheritance.<sup>33</sup> However; many other factors have considerable effects on the progression of BPH. This study revealed that being widowed/divorced is an independent risk factor for severe BPH-symptoms (AOR=4.5). It is not clear whether this is related to lack of family support for coping with BPH-symptoms or the lack of sexual activity in widowed/divorced men. No studies have definitely shown the role that sexual activity will make symptoms of BPH better. However, a previous study reported no association between marital status and BPH.<sup>34</sup> Furthermore, Fowke et al.<sup>28</sup> reported that marital status is not associated with progression to moderate /severe LUTS.

Diabetes mellitus was found to be an independent risk factor of severe BPH-symptoms. Both BPH and diabetes mellitus type 2 seem to be sharing similar epidemiological features, which are possibly connected to a common pathogenic pathway related to aging. The exact relationship remains unclear.<sup>35</sup> Sarma et al.<sup>36</sup> have demonstrated associations between diabetes and increased severity of irritative LUTS specially nocturia. They concluded that diabetes is less related to prostate growth and more related to the dynamic components of lower urinary tract function. Extensive diagnostic evaluation with urodynamics revealed that patients with LUTS suggestive of BPH with concomitant diabetes were not different from those without diabetes.<sup>37</sup>

The present study revealed that coronary heart disease is an independent risk factor for severe BPH-symptoms (AOR=6.3). This agrees with previous findings.<sup>34</sup> Both BPH and chronic kidney disease (CKD) are common among aging male, and leading some to suggest that it is a natural concomitant of aging.<sup>38</sup> This study revealed that renal diseases are an independent risk factor for severe BPH-symptoms (AOR=5.2). Rule et al.<sup>39</sup> concluded that there was a cross-sectional association between LUTS and CKD in community-dwelling men. A possible mechanism is obstructive uropathy in elderly patients.<sup>40,41</sup> Many studies found no association between LUTS /BPH (measured by IPSS) and renal diseases, nephrolithiasis and loss of kidney function after adjustment for age.<sup>42-44</sup>

Little is known about the QoL of elderly with BPH in Egypt. Although BPH and LUTS are not life-threatening conditions, their impact on QoL can be significant and should not be ignored.<sup>4,6</sup> The findings of the present study support the hypothesis of the negative association between severity of BPH-symptoms and QoL. There is a significant downward trend in the scores of the four domains of QoL with advancing the stage of BPH-symptoms. Furthermore, the total IPSS, voiding symptoms and storage symptoms scores were significantly inversely correlated with scores of the four domains of the QoL. This is consistent with Lee et al.<sup>22</sup> Babie et al,<sup>45</sup> who concluded that voiding and incontinence symptoms have high impact on all domains of QoL even after adjustment for comorbidities, income and household characteristics. This agrees with previous studies<sup>13,14</sup>; for example, Sountoulides et al.<sup>46</sup> who added that storage symptoms play a somewhat greater role. Urgency, a storage symptom, was found to be associated with a moderate inverse significant correlation with all domains of QoL. It was concluded that only some BPH-symptoms influence QoL. The feeling of incomplete bladder emptying, weak urine stream and nocturnal frequency showed negative correlation with QoL.<sup>47</sup> Daly et al,<sup>32</sup> claimed that there may be a direct association between LUTS severity and sexual dysfunction that may affect QoL.

## V. Conclusion

Based on the results of the present study, it can be concluded that BPH has emerged as a serious public health problem in elderly men. Elderly people who experience severe symptoms of BPH have a lower quality of life. Most elderly with BPH do not seek health care. The provision of educational programs for BPH may improve the quality of life of elderly men. All members of health team, including gerontological nurses, can contribute to the formulation, implementation and evaluation of such program. Special emphasis should be targeted to elderly at higher risk of BPH-symptoms that affect their QoL.

## Study Limitations

The findings of this study are limited to rural elderly of the targeted villages and cannot be generalized to elderly at the national level. For better generalization, a national large-scale community-based study is needed to give the full picture of BPH symptoms and their effects on QoL. The findings may be under or overestimated, to some extent, due to participants' memory and perception. The cross-sectional design of this study does not clearly show the sequential relationship by time.

**Conflicts of Interests:** None

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