

REVIEW ARTICLE

Benign Prostatic Hyperplasia: A Comprehensive Evidence-Based Review of Etiopathogenesis, Clinical Spectrum, Diagnostic Modalities, Therapeutic Interventions and Nursing Management

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ABSTRACT

Background: Benign Prostatic Hyperplasia (BPH) is a chronic, progressive, non-malignant enlargement of the prostate gland that commonly affects aging men. It is one of the leading causes of lower urinary tract symptoms (LUTS) worldwide and significantly influences physical comfort, psychological health, sleep quality, and overall quality of life.

Aim: To critically analyze and synthesize current evidence regarding the etiology, risk factors, pathophysiology, clinical presentation, diagnostic evaluation, medical and surgical management, and comprehensive nursing care of BPH.

Objectives:

1. To examine hormonal, inflammatory, and metabolic mechanisms contributing to BPH.
2. To describe symptom classification and disease progression.
3. To review contemporary diagnostic tools and investigations.
4. To evaluate pharmacological and surgical interventions.
5. To outline evidence-based nursing management strategies.

Materials and Methods: A narrative review was conducted using peer-reviewed journals, urology guidelines, textbooks, and evidence-based online medical resources. Literature was analyzed systematically and synthesized in structured format. References are cited in Vancouver style.

Results: BPH is strongly associated with aging, androgenic stimulation via dihydrotestosterone (DHT), chronic inflammation, and metabolic disturbances. Clinical manifestations range from mild urinary hesitancy to severe retention and renal compromise. Diagnosis involves digital rectal examination (DRE), prostate-

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specific antigen (PSA), uroflowmetry, imaging, and endoscopic assessment. Management includes alpha-adrenergic blockers, 5-alpha reductase inhibitors, minimally invasive therapies, and surgical interventions such as Transurethral Resection of the Prostate (TURP). Nursing care plays a critical role in monitoring urinary function, preventing complications, promoting fluid balance, and providing patient education.

Conclusion: BPH is a multifactorial age-related condition requiring individualized, multidisciplinary management. Early identification and comprehensive nursing support significantly improve patient outcomes and reduce complications.

KEYWORDS

• Benign Prostatic Hyperplasia • Lower Urinary Tract Symptoms • DHT • TURP
• Prostate Enlargement • Nursing Care

INTRODUCTION

Benign Prostatic Hyperplasia (BPH) refers to a non-cancerous proliferation of stromal and epithelial cells within the prostate gland, particularly in the transitional zone.¹ The prostate surrounds the proximal urethra; therefore, enlargement results in varying degrees of bladder outlet obstruction.

Epidemiological studies demonstrate that histological BPH is present in approximately 40% of men in their 50s and up to 80–90% of men older than 80 years.² Although not malignant, BPH can produce distressing urinary symptoms and may lead to serious complications including acute urinary retention, recurrent urinary tract infections, bladder calculi, hydronephrosis, and renal impairment.³

With increasing life expectancy globally, BPH represents a major public health concern. Its management requires integration of medical therapy, surgical intervention, and structured nursing care.

ANATOMY AND PHYSIOLOGY OF THE PROSTATE

The prostate gland is a fibromuscular exocrine organ located inferior to the urinary bladder and anterior to the rectum. It surrounds the prostatic urethra and contributes alkaline secretions to seminal fluid.⁴

Table 1: Functional Zones of the Prostate

Zone	Location	Clinical Significance
Peripheral Zone	Posterior region	Common site for carcinoma
Central Zone	Surrounds ejaculatory ducts	Less commonly affected
Transitional Zone	Around urethra	Primary site of BPH

BPH primarily originates in the transitional zone, where nodular hyperplasia compresses the urethral lumen.⁵

The prostate is androgen-dependent. Testosterone is converted into dihydrotestosterone (DHT) by 5-alpha reductase. DHT binds to androgen receptors and promotes cellular proliferation.⁶

ETIOLOGY AND RISK FACTORS

BPH is multifactorial, involving hormonal, inflammatory, genetic, and metabolic influences.

1. Hormonal Mechanisms

Role of DHT

DHT is the most potent androgen responsible for prostate growth. With aging, intraprostatic DHT levels remain elevated even when circulating testosterone declines.⁶ Persistent DHT stimulation causes stromal and epithelial proliferation.

Estrogen-Androgen Imbalance

Aging increases aromatase activity, converting testosterone to estrogen. Relative estrogen excess enhances stromal sensitivity to DHT.⁷

2. Chronic Inflammation

Histopathological studies show inflammatory infiltrates in 43–98% of BPH tissues.⁸ Chronic inflammation stimulates cytokine release, tissue remodeling, and fibromuscular growth.

3. Age

Age remains the strongest risk determinant. Cellular senescence and cumulative androgen exposure contribute significantly.²

4. Genetic Predisposition

Men with first-degree relatives diagnosed with BPH have increased risk.⁹

5. Metabolic Syndrome

Obesity, diabetes mellitus, hypertension, and dyslipidemia are strongly correlated with BPH.¹⁰

Mechanisms include:

- Hyperinsulinemia promoting cell growth
- Increased inflammatory mediators
- Altered autonomic tone

PATHOPHYSIOLOGY

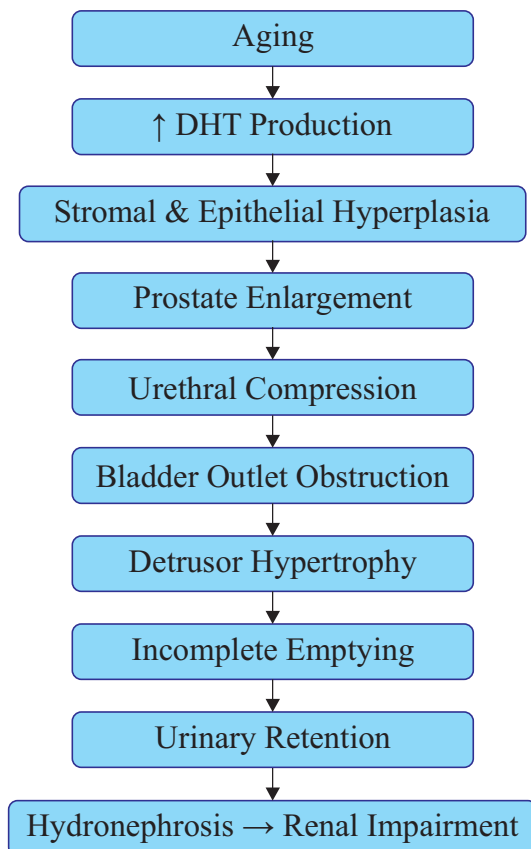
BPH pathogenesis involves both static and dynamic components.

Static Component

Enlarged prostate tissue mechanically compresses the urethra.

Dynamic Component

Increased alpha-adrenergic tone in smooth muscle raises urethral resistance.



Flowchart 1: Pathophysiology of BPH

CLINICAL MANIFESTATIONS

Symptoms are collectively termed Lower Urinary Tract Symptoms (LUTS).

Storage (Irritative) Symptoms

- Urinary frequency
- Urgency
- Nocturia
- Urge incontinence

Voiding (Obstructive) Symptoms

- Hesitancy
- Weak stream
- Intermittency
- Straining
- Post-void dribbling

Complications

- Acute urinary retention
- Recurrent UTIs
- Bladder stones
- Hematuria
- Renal insufficiency³

Table 2: Symptom Severity (IPSS Score)

Score Range	Severity
0–7	Mild
8–19	Moderate
20–35	Severe

The International Prostate Symptom Score (IPSS) is widely used to assess severity.¹¹

DIAGNOSTIC EVALUATION

Diagnosis is clinical and investigational.

1. History & Symptom Scoring

IPSS questionnaire.

2. Digital Rectal Examination (DRE)

Enlarged, smooth, firm prostate suggests BPH.¹

3. Laboratory Investigations

Test	Purpose
Urinalysis	Detect infection/hematuria
Serum Creatinine	Assess renal function
PSA	Rule out malignancy

PSA may be mildly elevated in BPH.¹²

4. Imaging

- Transrectal Ultrasound (TRUS)
- Uroflowmetry

- Post-void residual measurement
- Cystoscopy
- IVP (if renal involvement suspected)

MEDICAL MANAGEMENT

Treatment depends on severity.

1. Alpha-Adrenergic Blockers

Examples: Tamsulosin, Alfuzosin, Terazosin
Mechanism: Relax smooth muscle of bladder neck.¹³ Effect: Rapid symptom relief.

Side effects: Hypotension, dizziness, retrograde ejaculation.

2. 5-Alpha Reductase Inhibitors

Examples: Finasteride, Dutasteride
Mechanism: Inhibit DHT production.⁶

Effect: Reduce prostate size (takes 3–6 months).

3. Combination Therapy

Most effective in moderate to severe disease.¹³

4. Phosphodiesterase-5 Inhibitors

Tadalafil improves LUTS and erectile function.

5. Herbal Therapy

Saw Palmetto has variable evidence; not universally recommended.¹⁴

SURGICAL MANAGEMENT

Indicated when:

- Recurrent urinary retention
- Recurrent UTIs
- Bladder stones
- Renal insufficiency
- Failed medical therapy

1. Transurethral Resection of the Prostate (TURP)

Gold standard procedure.¹⁵ Resects obstructing tissue via resectoscope.

Complications:

- Bleeding
- TURP syndrome
- Retrograde ejaculation

2. Laser Therapies

Procedure	Mechanism	Benefit
HoLEP	Laser enucleation	Effective for large prostates
PVP	Vaporization	Minimal bleeding

3. Minimally Invasive Techniques

- TUMT
- TUNA
- UroLift
- Prostate Artery Embolization

Shorter recovery but variable durability.

Mild Symptoms

- Lifestyle Modification
- Observation

Moderate Symptoms

- Alpha Blockers ± 5ARI
Severe / Complicated
- Surgical Intervention

Flowchart 2: Management Algorithm

NURSING MANAGEMENT

Nursing care is essential across all stages.

Nursing Diagnosis 1: Impaired Urinary Elimination

Interventions

- Monitor intake/output
- Assess bladder distension
- Timed voiding schedule
- Catheter care
- Administer medications

Nursing Diagnosis 2: Acute Pain

- Pain assessment scale
- Warm sitz bath
- Relaxation therapy
- Administer prescribed analgesics

Nursing Diagnosis 3: Risk for Fluid Volume Deficit

- Monitor urine output hourly
- Assess vital signs
- Maintain IV fluids if required

Nursing Diagnosis 4: Anxiety

- Provide reassurance
- Explain procedures
- Encourage verbalization

Nursing Diagnosis 5: Knowledge Deficit

Patient Education Includes:

- Medication adherence
- Avoid caffeine/alcohol
- Pelvic floor exercises
- Importance of follow-up
- Recognizing danger signs

Table 3: Post-TURP Nursing Care

Nursing Action	Rationale
Continuous bladder irrigation	Prevent clot retention
Monitor urine color	Detect bleeding
Assess catheter patency	Prevent obstruction
Monitor electrolytes	Detect TURP syndrome
Encourage fluids	Prevent infection

PREVENTIVE STRATEGIES

- Weight control
- Regular exercise
- Balanced diet
- Glycemic control
- Regular screening after age 50

PROGNOSIS

Most patients respond well to pharmacotherapy. Surgical outcomes are highly effective with durable relief. Untreated severe obstruction may result in irreversible renal damage.³

CONCLUSION

Benign Prostatic Hyperplasia is a progressive, androgen-dependent, multifactorial condition predominantly affecting aging men. It presents with a spectrum of lower urinary tract symptoms that can significantly impair quality of life. Early recognition, appropriate pharmacological therapy, timely surgical intervention, and structured nursing management are essential for optimal

outcomes. A multidisciplinary approach improves symptom control, prevents complications, and enhances patient education and satisfaction.

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Ethics Declaration

This review utilized published data only and required no ethical approval.

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