

Importance of personal hygiene practices in preventing urinary tract infections – a study reference to pregnant women in Andhra Pradesh affected by UTI

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Abstract — Urinary tract infections (UTIs) remain one of the most prevalent bacterial infections globally, disproportionately affecting women due to anatomical factors. While antimicrobial therapy is the cornerstone of treatment, recurrent UTIs contribute to antibiotic resistance and reduced quality of life. Personal hygiene practices serve as a primary, cost-effective, and non-pharmacological strategy for prevention by minimizing bacterial ascension from the perineal area into the urinary tract. This narrative review synthesizes evidence from clinical guidelines (CDC, AUA) and recent studies on key hygiene interventions, including front-to-back wiping, genital cleaning techniques, post-coital voiding, and clothing choices. Findings underscore that consistent hygiene education by nurses can significantly reduce UTI incidence and recurrence. Implications for nursing practice, patient education, and future research are discussed.

Keywords — Urinary tract infections, personal hygiene, prevention, perineal care, nursing education, women's health

I. INTRODUCTION

Urinary tract infections (UTIs) affect over 150 million people annually worldwide, with women experiencing a lifetime risk of up to 60%. In India, studies among female students and community populations report prevalence rates ranging from 10–25%, with higher rates among nursing students and those in hostel settings. The primary pathogen, *Escherichia coli* (accounting for 70–90% of cases), originates from the gastrointestinal tract and ascends via the short female urethra.

Recurrent UTIs (rUTIs), defined as two or more episodes in six months or three or more in twelve months, pose a major challenge. Beyond discomfort, they lead to increased healthcare utilization, antibiotic overuse, and antimicrobial resistance. Behavioral and hygiene factors are modifiable risk

elements that nurses can target effectively through patient education and counseling.

In India, particularly in states such as Andhra Pradesh, UTIs among pregnant women remain prevalent due to a combination of biological vulnerability and socio-environmental factors. Among these, personal hygiene practices play a crucial role in either increasing or reducing the risk of infection. This paper elaborates on the importance of personal hygiene in preventing UTIs, with reference to studies conducted among pregnant women in Andhra Pradesh.

Burden of UTIs among Pregnant Women

Urinary tract infections (UTIs) represent a significant health concern among pregnant women, contributing substantially to maternal morbidity worldwide. These infections may present either as symptomatic UTIs, characterized by clinical manifestations such as dysuria, urgency, and lower abdominal discomfort, or as asymptomatic bacteriuria, where significant bacterial colonization of the urinary tract occurs without noticeable symptoms. Despite the absence of symptoms, asymptomatic bacteriuria is clinically important, as studies indicate that approximately 20–30% of untreated cases progress to symptomatic infection, including acute cystitis and pyelonephritis, which can lead to serious complications during pregnancy.

Evidence from regional studies conducted in Visakhapatnam and Nellore demonstrates a considerable prevalence of UTIs among antenatal women in Andhra Pradesh. These findings reflect not only the biological susceptibility associated with pregnancy but also the influence of environmental, behavioral, and socio-economic factors prevalent in these areas. The burden is further compounded by limited awareness, inadequate sanitation, and

restricted access to quality healthcare services in certain communities.

Microbiological investigations consistently identify *Escherichia coli* as the predominant causative organism, accounting for the majority of UTI cases in pregnancy. This bacterium typically originates from the gastrointestinal tract and colonizes the perineal region, from where it can ascend through the urethra into the urinary tract. The close anatomical proximity of the urethra to the anus in females facilitates this mode of infection, particularly in the presence of poor personal hygiene practices.

The high prevalence of UTIs among pregnant women in Andhra Pradesh underscores the urgent need for effective preventive strategies. Given the constraints in resource-limited settings, emphasis should be placed on simple, cost-effective, and sustainable interventions, particularly those related to personal hygiene. Improving awareness and adoption of proper hygiene practices can play a pivotal role in reducing infection rates and improving maternal and fetal health outcomes.

Physiological Changes in Pregnancy Predisposing to UTI

Pregnancy induces several changes that increase the risk of urinary infections:

- **Hormonal changes:** Increased progesterone levels cause relaxation of smooth muscles, leading to urinary stasis.
- **Mechanical pressure:** The growing uterus compresses the bladder and ureters, hindering urine flow.
- **Changes in urine composition:** Glycosuria and aminoaciduria provide a favorable environment for bacterial growth.
- **Reduced immunity:** Pregnant women experience relative immunosuppression, making them more susceptible to infections.

Due to these factors, even minor lapses in hygiene can result in infection, emphasizing the importance of maintaining strict personal hygiene.

Pathophysiology of Urinary Tract Infections (UTIs)
Urinary tract infections (UTIs) occur when pathogenic microorganisms, most commonly *Escherichia coli*, enter the urinary tract and multiply, leading to infection. In females, the short length of the urethra and its close proximity to the anal region facilitate the transfer of enteric bacteria to the urethral

opening. These microorganisms initially colonize the periurethral area and adhere to the epithelial lining using specialized structures, allowing them to resist the flushing action of urine. Once established, the bacteria ascend through the urethra into the bladder, where they multiply rapidly in the urine, resulting in inflammation of the bladder lining (cystitis). The host immune response is activated, leading to the release of inflammatory mediators and the accumulation of white blood cells, which produce symptoms such as dysuria, urinary frequency, urgency, and lower abdominal discomfort. If left untreated, the infection may spread upward through the ureters to the kidneys, causing pyelonephritis, a more severe condition that can result in systemic complications. In pregnant women, physiological changes such as hormonal relaxation of smooth muscles, urinary stasis, and reduced immunity further facilitate bacterial growth and ascent, thereby increasing susceptibility to UTIs.

Evidence-Based Personal Hygiene Practices for UTI Prevention

1. Perineal Wiping Technique

Always wipe from front to back after urination or defecation. This unidirectional motion prevents transfer of enteric bacteria (*E. coli*) from the anal region to the urethra and vagina. Multiple studies and guidelines (CDC, Medscape) consistently recommend this as a fundamental practice. Wiping back-to-front or reusing tissue increases risk significantly.

2. Gentle Genital Cleansing

Daily cleansing of the vulvar and perineal area with plain warm water or mild, unscented soap is advised. Avoid douching, feminine sprays, powders, scented wipes, or harsh alkaline soaps, as these can alter vaginal pH (normally 3.8–4.5), disrupt protective flora, and cause irritation. Showers are preferred over baths to reduce bacterial exposure in contaminated water. Hand hygiene (washing with soap and water) before and after genital contact or toileting is essential.

3. Voiding Habits

- Urinate after sexual intercourse within 15–30 minutes to flush introduced bacteria. Pre-coital voiding may also help.
- Avoid holding urine; empty the bladder every 3–4 hours or when the urge arises to prevent stasis.
- Ensure complete bladder emptying (double voiding technique if needed).

4. Clothing and Moisture Management

Wear breathable cotton underwear and loose-fitting clothing. Change underwear daily and immediately after exercise, swimming, or heavy perspiration. Avoid tight synthetic fabrics that promote warmth and moisture—ideal conditions for bacterial proliferation.

5. Menstrual Hygiene

Change sanitary pads or tampons every 4–6 hours. Some evidence suggests pads may be preferable to tampons for women prone to rUTIs, though individual factors vary. Maintain extra perineal washing during menstruation.

Supporting Lifestyle Measures

- Hydration: Increase fluid intake to 2–3 liters of water daily. A randomized trial showed that increasing intake by 1.5 L/day reduced UTI episodes by nearly 50% in women with low baseline consumption.
- Sexual and Contraceptive Practices: Avoid spermicides and diaphragms if recurrent infections occur; discuss alternatives with a provider.
- Postmenopausal Care: Topical vaginal estrogen may restore urogenital tissue integrity in hypoestrogenic states.

Role of Nurses in UTI Prevention

As frontline educators, nurses play a pivotal role in assessing hygiene knowledge, providing tailored counseling, and evaluating adherence. Structured patient education programs have demonstrated improvements in knowledge, behavior change (e.g., front-to-back wiping, increased voiding), and reduced UTI recurrence. In clinical, community, and academic settings, nurses can integrate hygiene teaching into routine care, antenatal/postnatal visits, and school health programs.

II. LIMITATIONS OF EVIDENCE AND FUTURE DIRECTIONS

While behavioral interventions show promise, many studies are observational or have small samples, leading to moderate evidence strength for some practices (e.g., wiping direction). Large-scale randomized controlled trials in diverse Indian populations are needed. Future research should explore culturally tailored nursing interventions, digital education tools, and combined hygiene-probiotic strategies.

III. CONCLUSION

Personal hygiene practices form the foundation of UTI prevention strategies. Consistent front-to-back wiping, gentle cleansing, timely voiding, and supportive habits like adequate hydration can substantially lower incidence and recurrence rates. For PhD-level nursing scholarship and clinical practice, emphasizing evidence-based hygiene education empowers women, reduces healthcare burden, and supports antimicrobial stewardship. Nurses must advocate for and deliver high-quality, patient-centered prevention programs.

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