

12-5-2022

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Recommended Citation

Marlett, M. (2022). Nursing Considerations for Elderly Adults with Urinary Tract Infections in Nursing Homes. *D.U.Quark*, 7 (1). Retrieved from <https://dsc.duq.edu/duquark/vol7/iss1/4>

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Nursing Considerations for Elderly Adults with Urinary Tract Infections in Nursing Homes

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D.U.Quark Volume 7(Issue 1) pgs.66-75

Published December 5, 2022

Peer Reviewed Article

Abstract

The elderly population is growing, making their health problems a priority to address. Urinary Tract Infections (UTI) are prominent and deadly in the older adult population. This review will discuss risk factors for and detection of a UTI using urine dipsticks and urine cultures. It will cover the effect of a UTI on the elderly as well as antibiotic treatment and nursing care for the elderly adult with a UTI. There are specific considerations necessary for nurses to understand in order to reduce the prevalence of Urinary Tract Infections. Adequate hydration, perineal hygiene, and frequent toileting are important prevention measures against UTIs. The elderly adult with dementia or cognitive impairment faces additional challenges related to a UTI. There are not many studies that look specifically at how to decrease the danger of UTIs for that population, which is a topic for future research.

Keywords: Urinary Tract Infection (UTI), Elderly, Mortality, Risk factors, Nurses

Introduction

A Urinary Tract Infection (UTI) is any infection from the bladder to the end of the urethra. UTIs are very common in the elderly population and can have as high as a 33% mortality of hospitalized elderly with bacteremia UTIs.¹ The elderly population is growing with experts predicting that by 2050, the elderly population will be doubled from 2017.²

Consequently, the illnesses that affect the elderly population are of increasing importance for the healthcare field and those who offer direct care for the elderly, which are most commonly nurses.

The elderly adult with a UTI presents symptoms differently than a typical adult. There is often a change in mental status, nausea, incontinence, and urinary retention rather than fever, dysuria, and perineal pain.³ The vague symptoms make it difficult to determine if the individual is ill with a UTI or has another disease where those symptoms are predominant. Knowing the risk factors aids the nurse in understanding the interventions necessary to care for the elderly adult. Since detection of UTIs in the elderly adult can be difficult, nurses need to be educated and have the tools to correctly recognize and treat the UTI in the elderly population. This review will discuss the challenges facing health care professionals regarding elderly adults with UTIs, including recognizing risk factors, the detection of the UTI, and effective treatments.

Risk Factors for Urinary Tract Infections

There are several risk factors for the Urinary Tract Infections. Toileting habits or methods, specific diseases, and the number of diseases can contribute to the incidence of Urinary Tract Infections. The use of urinary catheters is a significant risk to obtaining a UTI. Eighty-one percent of those with catheters had a UTI.⁴ This is a large risk factor for a UTI in the elderly adult. As a result, nurses need to carefully evaluate when catheters are necessary.

A common reason to initiate a urinary catheter is urinary incontinence. Urinary incontinence, even without urinary catheter treatment, presents a risk for UTIs. The incidence

of urinary incontinence can be as high as 14% and the mortality 39.6%.^{1, 5} Interventions to lessen the effects of urinary incontinence include strengthening the pelvic floor (the muscles that support the urinary bladder). The use of D-mannose powder, a sugar that binds to certain types of bacteria, has been shown to reduce the absolute risk of recurrent UTI by 45%.⁶ The use of D-mannose along with pelvic floor exercises (Kegel exercises) can be used to reduce the impact of urinary incontinence.

Diabetes and dementia carry a high risk for UTIs. 23.52% percent of patients with diabetes had a UTI.⁷ Education on the UTI prevention should be a goal for nurses caring for those with diabetes. The importance of sufficient hydration and frequent toileting should be included in teaching for those with diabetes. Dementia is an enormous risk for a UTI as 79.1% of those with dementia had a UTI.⁸ Careful incontinence care provided by nurses and care staff will help decrease the incidence of UTIs in patients with dementia. These diagnoses significantly impact the elderly adult and their risk for a UTI. In addition to specific diseases, the number of diseases (comorbidities) further the risk of mortality.

An increase in the number of diagnoses presents a higher mortality rate in the elderly. The mortality rate of UTIs among those with 2-3 diagnoses is 17%, and continues to climb with 4-5 at 35.4% and 6+ diagnoses as high as 51.1%.¹ Nurses should give particular attention to the increased risk for mortality for this population.

The elderly adult requires knowledgeable and proactive nurses to protect against

UTIs. A prediction tool, Prediction Rule for Admission policy in Complicated urinary Tract InfeCtion IEiden (PRACTICE), used for admissions of complicated UTI scores various comorbidities, living situation, and signs and symptoms to categorize patients by risk groups.⁹ Using this tool in a randomized trial, those with a high risk class in the intervention group had a lower 90-day mortality rate (10%) as well as lower ICU admission rate (5%) compared to the control group with 15% and 11%, respectively.⁹ Nurse education and implementation of tools like the PRACTICE tool and recognition of symptoms may lead to improved patient outcomes.

Additionally, the use of a continence nurse's program at the nursing home was effective in reducing falls and UTIs.¹⁰ A nursing home in Connecticut implemented a program individualized to the nursing home from a continence specialist, which lowered UTI incidence 4% over one year and decreased falls by 30 each month.¹⁰ The individualized approach to incontinence care is critical to nursing care as each elderly adult has different risk factors and needs for interventions based on risk factors.

Detection of Urinary Tract Infections

Two important biomarkers used for the detection of a UTI are nitrites and leukocyte esterase (LE). They are present in the urine of an individual with a UTI. A urine dipstick that tests for the presence of nitrites and LE is a common and un-invasive method of detecting a UTI.¹¹ The nitrite and LE urine dipstick has a strong Positive Predictive Value (PPV) of 96% for nitrite, a Negative Predictive Value of 30% and Positive Predictive Value of 79% for LE.¹¹ Positive Predictive Value is the reliability of the test to accurately predict the presence of the

UTI while the Negative Predictive Value refers to the accuracy of a negative result to predict the absence of a UTI. The urine dipstick testing for nitrite and LE is an accurate method of diagnosing symptomatic UTIs due to the Predictive values. For this reason, the urine dipstick is used to assist in the diagnosis of a UTI. However, the test does not detect the specific bacteria responsible for the infection, which is often used to prescribe treatment.

The urine sample must be sent to a lab to get tested for the culture of the infection. A urine culture is done in a laboratory where the bacteria responsible for the UTI is identified and tested for a sensitivity to a specific antibiotic.¹² This is the gold standard for the detection of bacteria in order to prescribe the best antibiotic to treat the infection. Administering bacteria specific antibiotics reduces antibiotic resistance because overuse of a general antibiotic causes the bacteria to grow in strength.

Treatment for UTI

The treatment for symptomatic UTIs is a prescription of antibiotics, which kill the bacteria responsible for the infection. The most common bacteria responsible for the UTI in the elderly is *Escherichia coli*.¹³ Antibiotic resistance, however, can make the administration of an antibiotic difficult as not each antibiotic can kill every bacteria. One study shows that out of 11 common oral antibiotics, *E coli* had a susceptibility greater than 90% to only two of these antibiotics.¹³ This impacts how effective antibiotics are to treat a UTI. Additionally, a resistance to one antibiotic can lead to resistance to other antibiotics.

When examining various antibiotic resistance, gentamicin resistant *E. coli* was found to be 87.5% resistant to ampicillin and 54.2% resistant to trimethoprim, both of which are different types of antibiotics.¹⁴ A study looking at antibiotic susceptibility over the course of four years showed overall lower susceptibility in patients 65 years and older, residing in long term care facilities compared to the general population of 65 years and older.¹⁵ This demonstrates that residence in a nursing home is a risk factor for antibiotic resistance.

An effective way to combat antibiotic resistance is to treat UTIs with narrow-spectrum antibiotics specific to the susceptibility of the bacteria responsible for the infection.¹⁶ This targets a specific bacteria rather than treating with a broader less focused antibiotic. Nurses must closely monitor residents for disease resolution and ensure the antibiotic prescribed is suitable for the susceptibility of the bacteria to combat antibiotic resistance.

Conclusion

The growing elderly population and the illnesses they face are a concern for the healthcare system. UTIs are dangerous and costly for the elderly adult. The elderly adult with a UTI presents with different symptoms than the adult. While UTIs can be identified with a urine dipstick, the urine must be cultured to find the bacteria responsible for the infection in order to administer effective treatment.

Nurses who care for the elderly population with UTIs should be educated on these risk factors for incidence and mortality. Common symptoms are urinary incontinence and confusion or change in mental status, making it difficult to recognize. When diagnosed, an

antibiotic that is most effective to resolve the specific bacteria is prescribed to treat the UTI. The early recognition of a UTI will lead to prompt treatment and better outcomes for the patient.

Future research can be focused on considerations for the incontinent or cognitively impaired elderly adult. There are several unique challenges with this population, such as addressing how to properly collect the urine to diagnose a UTI from a symptomatic individual. The inability to follow instructions and comprehend the need for treatment affects the willingness to participate in UTI prevention and treatment. Further study and methods must be developed in order to effectively diagnose and treat the cognitively impaired elderly adult.

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Table 1. Risk Factors and associated mortality rate for Urinary Tract Infections

Risk Factor	Incidence (%)	Mortality (%)	Participants (source #)	Reference Number
Nursing Home	34.5	37.9	191	1
Dementia	79.1 -	- 42.5	67 191	7 1
Diabetes	26.8 -	- 33.9	310 191	5 1
Catheters	34.3	62.4	981	17
Urinary Incontinence	14 -	- 39.6	250 191	5 1

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