A Systematic Review of Key Factors Related to UTIs in the Elderly

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Introduction

Urinary tract infections (UTIs) are a common infection that occurs when bacteria enter the urethra and infect the urinary tract.

- Bladder infection (cystitis) is the most common
- Kidney infection can also occur (pyelonephritis)

- UTIs are common, affecting 150 million people each year worldwide (Rodriguez-Mañas, 2020).
- UTI's are the second-most common infection in elderly women living in the community, and the most common cause of infection in hospitalized elderly women or residents in long-term care (Rodriguez-Mañas, 2020).
- In the elderly, UTI's are often associated with a range of comorbidities such as incontinence, immobility, and cognitive impairment, and place patients at high risk for confusion, falls, acute kidney injury and hospital admissions (Zeng, et al., 2020).
- The importance of rapid identification and treatment of UTIs is crucial to the overall outcomes of this population (Rodriguez-Mañas, 2020).

Purpose

This systematic review examines the importance of identifying key factors related to unconfirmed urinary tract infections in the elderly population.

PICOT

In older-aged, frail adults, what are the predictive key factors to consider when planning treatment for suspected but unconfirmed urinary tract infection?

Methods

Literature review

- A literature review was conducted between August – November 2022.
- The search included a comprehensive exploration of PubMed, CINAHL and MEDLINE.
- Search terms included "urinary tract infection", "symptoms of UTI", "dysuria", "pyuria", "hematuria", "urgency", and "frequency".
- Inclusion Criteria: studies published within the last 12 years, with adult subjects, in the English language.
- Exclusion Criteria: studies irrelevant to the clinical identifiers of symptoms, those duplication of evidence or lack of evidence, studies being too old or irrelevant population.
- The initial search with the suicidality terms produced 703 results, and the subsequent search for relevant information produced 100 results.
- After a thorough review of all the articles for inclusion and exclusion criteria, six articles were extracted all of which were retrospective cohort studies.

References available upon request

Results

Search Results

The CINAHL and PUBMED databases were searched using the keywords in various combinations. After duplications and unrelated articles were removed, 329 articles were further screened. Further filters were applied to narrow the search to articles meeting the publication date inclusion criteria. Further review of full text for inclusion criteria and quality appraisal left 6 studies selected for inclusion in this systematic review A flow diagram was used to show the literature search process

- Six studies in the systematic review: Alpay, et al., 2018; Butler, et al., 2017; Calijouw, et al., 2011; Jackson, et al., 2004; Jorgensen, et al., 2018; and Linhares, et al., 2013
- A retrospective cohort design was used to evaluate outcomes regarding identification of UTIs in the elderly population.
- All studies focused on key symptoms used to identify urinary tract infections in the elderly.
- Sample sizes ranged from 140 (Alpay et al., 2018) to 155,597 (Linhares et al., 2013) with a total sample size across all studies equaling 158,380.
- General characteristics of participants included in the studies ranged in age from 39-92 years of age, residing in nursing homes or the general community, or who were hospitalized or seen in emergency department settings. Study settings included Turkey (Alpay et al., 2018), Europe (Linhares et al., 2013; Calijouw et al., 2011; Butler et al., 2017), and the United States (Jorgensen et al., 2018; Jackson et al., 2004).
- An evidence synthesis table was utilized to organize and synthesize study information.
- Two main themes were identified while performing the research:
  - *Theme 1*: **Physical Findings**: Four articles found that women made up a large percentage of the elderly population who were diagnosed with UTI (Linhares et al., 2013; Cliijouw et al., 2011; Butler et al., 2017; Jackson et al., 2004). All articles except Linhares et al., 2013 and Jackson et al., 2004, determined that fever, nausea and vomiting, dysuria, hematuria, urgency, frequency, altered mental status, and decline in mobility were all common symptoms displayed in elderly patients diagnosed with UTI.
  - *Theme 2*: **Historical/Comorbidity Factors**: Personal history of diabetes is described in many of the articles as being an important co-existing condition in most cases (Alpay et al., 2018; Jorgensen et al., 2018; Jackson et al., 2004). One article focused on co-morbidities present in most suspected UTI cases as diabetes at 67% of positive urinary tract infection cases, history of recurrent UTIs at 24%, and history of renal calculi at 9% (Jackson et al., 2004). There was also a noted increase in the average number of samples positive for urinary tract infection from nursing home settings (64% of the positive tests), versus community settings (36% of positive tests), who presented to the emergency room (Jorgenson et al., 2018).

Key factors identified through research

	Clijouw et al., 2011	Butler et al., 2017	Alpay et al., 2018	Jorgensen et al., 2018
Fever	52%	45%	None stated	None stated
Nausea and Vomiting	Not stated	22%	None stated	18%
Dysuria	20%	18%	33%	43%
Hematuria	60%	44%	60%	51%
Urgency or Frequency	67%	58%	55%	59%
Altered Mental Status	81%	79%	71%	75%
Decline in Mobility	84%	80%	88%	79%

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Implications for Practice

- In the elderly, it is important to quickly identify those who are presenting with key predictive factors for a urinary tract infection to properly treat this patient in a timely manner to avoid complications.
- The elderly are highly susceptible to the complications related to untreated urinary tract infections (Chu & Lowder, 2018).
- It is important to recognize females with a personal history of diabetes, renal calculi, or history of UTI, and have acute fever, altered mental status, dysuria, hematuria, or abdominal pain, to consider this specific identification as having the predictive key factors of possible UTI, and promptly obtain a UA with Micro and either empirically treat, or prepare for treatment as appropriate.
- Implications for further research would be to better identify and treat urinary tract infections as quickly as possible to avoid serious complications or illness, including debility or death to this population.
- The symptoms most identified in this population as being the most common were history of diabetes, previous history of UTI, altered mental status, physical limitations, and being female.
- I believe improvements can be made in identification and treatment of UTIs in the elderly with further quality improvement projects, more research into the signs and symptoms noted in a larger population with the ley focus on identification prior to having positive confirmation of urinary tract infection.

Recommendations

- According to the studies reviewed, key predictive factors for UTI in the elderly population include being female, presenting with a comorbidity of diabetes, history of UTI, history of renal calculi, and physical symptoms of acute fever, dysuria, abdominal pain, hematuria, urinary frequency, altered mental status, and a recent decline in mobility or independent functioning.
- Although these findings do not specify how many of these symptoms or which combination of symptoms is most diagnostic, they do offer providers an evidence-based list of symptoms from which to gauge the next step more easily in diagnosis or treatment.
- In the presence of any of these factors in this population, especially when more than one is present, UTI should be suspected and urinalysis with reflex to microscopic urine culture should be ordered and antimicrobial treatment should be started as soon as a positive urine culture is noted (Fagan et al., 2015).
- Empirical treatment for uncomplicated UTI or for those who are not at high risk for side effects related to use of antibiotics can be done at the provider's and patient's discretion (Gharbi et al., 2019). Identifying these common signs and symptoms may be helpful when making this decision.
- The International Clinical Practice Guideline for Acute Uncomplicated Cystitis and Pyelonephritis in Women: A 2010 update by the Infectious Disease Society of America and the European Society for Microbiology and Infectious Diseases, recommends treatment with nitrofurantoin monohydrate macrocrystals 100 mg twice daily for 5 days, or trimethoprim/sulfamethoxazole 160/800 mg twice daily for 3 days if local resistance rates do not exceed 20% (Rowe & Juthani-Mehta, 2013; Gupta et al., 2011).

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