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Urinary Tract Infection among Women in Nursing Homes: Prevention and Nursing Interventions – A Systematic Review

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Abstract

Urinary Tract Infection (UTI) is identified as one of the most common types of infection worldwide. The incidence of UTI in nursing home context is increasing, so as the prevalence among older women. This thesis aims at enhancing knowledge of the nurse's role in interventions and prevention of Urinary Tract Infection (UTI) among elderly women in nursing homes by answering two research question: 1) What can nurses do to prevent occurrence of UTI in elderly women? and 2) What is the nurse's role in management of UTI among elderly women?

A systematic review was chosen as the methodology of this research paper. 10 scientific peer-reviewed articles were selected with the help of inclusion and exclusion criteria proposed in PRISMA chart. Data were synthesized, coded, and categorized into themes to identify meaningful information.

As a result, the main findings were categorized into three groups: clinical management, risk management, and educational intervention. Better knowledge of assessment and diagnose plays a substantial role in reducing the rate of infection, improving antibiotic stewardship, and avoiding unnecessary hospitalization, Moreover, management of risk factors, such as catheter-associated UTI (CAUTI) and multidrug resistant (MDR) bacteria remain inconsistent and require a more thorough evaluation of related factors. Besides, research findings also emphasize the need for continuous education and training programs for both clients and nursing staff with sufficient scientific information. This thesis unveils the possibilities for future research focusing on a more gender-oriented approach in the implementation of nursing interventions for UTI.

Language: English Key words: Urinary Tract Infection, prevention, nursing care, nursing interventions

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1 Introduction

Urinary Tract Infections (UTIs), also known as Urological Infections, are regarded as one of the most common types of infection globally. The increased rate of hospitalization due to infections in urinary tract poses a heavy burden on health care systems. Besides, the infections endanger quality of life of the patients (Öztürk & Murt, 2020).

The Global Burden of Disease study edone by the World Health Organisation (WHO) revealed that in 2017, the incidence of UTIs accounted for nearly 274 million new cases worldwide, in all age groups and both genders (WHO, 2021). UTI is among the most frequent diagnosis of infection in long-term care settings. The prevalence of UTI is estimated to be between 30%-40% of all infections associated with nursing homes. The UTI incidence in menopausal women is stated to be approximately 0.07 per person per year. Respectively, the figure is 0.13 in adults over 85 years old (Rowe & Juthani-Mehta, 2014).

In Finland, according to the Finnish Institute of Health and Welfare (THL), approximately 100,000 cases of healthcare-associated infections occur each year. 50% of these cases arise in long-term care homes. Furthermore, urinary tract infections are among the most common infections in long-term care settings together with respiratory tract infections, and skin and soft tissue infections (THL, 2020). Incidence of UTI accounts for over a third of all infections diagnosed in nursing home settings (Rowe & Juthani-Mehta, 2013). According to The Finnish Medical Society Duodecim (2020), incidence of UTI among women is remarkable. Up to 50% of women is affected by infection in the urinary tract at least once throughout their lifetimes. Moreover, the risk of UTI increases also after menopause. Recurrence of UTI accounts for 20%-40% of women who has had urinary infection previously. Therefore, susceptibility of women getting infected in the urinary tract is considerably high, especially women in older age.

Better understanding of UTI and nursing interventions helps nurses improve management of the disease to ensure patient safety, and to enhance quality of life for the patients. Besides, effective control of infection decreases antimicrobial misuse and reduces pressure of hospitalization on healthcare systems. This motivates the research paper to be carried out.

2 Background

This chapter describes background information of Urinary Tract Infection with its associated aspects. Firstly, symptoms and causes of UTI are discussed; then risk factors such as aging, catheter use, and health conditions are brought in with more details. Later, various methods for UTI diagnosis provide explanations for how UTI is detected. Then, there will be suggestions on treatment to UTI and what can be performed to prevent occurrence of UTI. Lastly, the nurse's role in caring for patients with UTI is reviewed.

2.1 What is UTI?

Centers for Disease Control and Prevention (CDC) defines that UTIs occur when bacteria invade urinary tract and cause infection to this urine drainage system. The urinary tract in humans consists of kidneys, ureters, urine bladder, and urethra. Infections can happen at any parts of the urinary system. However, bladder infection (cystitis) is the most common type (CDC, 2021).

Classification of UTI may differ. UTI can be classified according to its severity of being uncomplicated or complicated, which was proposed by the European Association of Urology. Besides, UTI can also be classified according to place of acquisition or host factors. These classification approaches are illustrated in the following Table 1 and Table 2 (Öztürk & Murt, 2020).

Complication status	
Uncomplicated UTIs (low risk)	Complicated UTIs (high risk)
Cystitis Pyelonephritis Recurrent UTIs Urosepsis	Cystitis Pyelonephritis Recurrent UTIs Catheter-related UTIs UTI in men Urosepsis

Table 1: Classification of Urinary Tract Infections according to complication status **(Öztürk & Murt, 2020)**

Based on the status of complication, UTI is categorized into uncomplicated UTI and complicated UTI. Uncomplicated UTIs consist of cystitis (bladder infection), pyelonephritis (kidney infection), recurrent UTIs, and urosepsis (spreading of untreated urinary tract infection). When uncomplicated UTIs are left untreated, they can progress to be complicated UTIs. Catheter-related UTIs and UTI in men fall also into complicated UTI category (Öztürk & Murt, 2020).

Epidemiologic characteristic	
Place of acquisition	Host factors
Community-acquired UTIs Healthcare-associated UTIs Community-onset healthcare-associated UTIs	UTIs in diabetes UTIs in the elderly UTIs in pregnancy UTIs in kidney transplantation UTIs in patients with spinal cord injuries

Table 2: Classification of urinary tract infections according to epidemiologic characteristics **(Öztürk & Murt, 2020)**

On the other hand, LeMone and the co-authors (2015, p. 748) state that UTIs can be categorized based on anatomical characteristics, as either lower UTIs (*urethritis* – urethra infection, *prostatitis* – prostate gland infection, and *cystitis* – urine bladder infection) or upper UTIs (*pyelonephritis* – infection of the kidney). UTIs can also be categorized as either community-acquired or catheter- associated, based on epidemiological features.

2.2 Symptoms

Symptoms of UTI depend largely on the type of infection. Symptoms of bladder infection (cystitis), as an illustration, comprise pain or burning sensation when voiding, also known as dysuria, and cloudy urine, also known as pyuria. In addition, manifestations of cystitis involve frequent urination, blood in the urine, and nocturia – a condition when the urge for urinating arrives more than two times at night. People with cystitis may also experience pain or pressure in the lower abdomen or feel the urge to void despite of an empty bladder (CDC, 2021; LeMone, Burke, Bauldoff, & Gubrud, 2015, p. 748).

With kidney infection, also known as pyelonephritis, manifestations include fever, nausea and vomiting. Furthermore, a person whose kidney(s) is infected may feel shivering and pain in the lower back (CDC, 2021).

Manifestations of UTI in the elderly vary from dysuria (pain or burning sensation when voiding) to urinary incontinence, hematuria (bloody urine), and confusion. It is also important to note that a great deal of UTI incidence among older adults is asymptomatic. Certain symptoms such as fever, shivering, pain, and tenderness may not appear (LeMone, Burke, Bauldoff, & Gubrud, 2015)

2.3 Causes

UTIs are normally caused by bacteria from feces entering urethra and invading urinary tract (NHS, 2022). *E. coli* is claimed to be the dominant microbe to cause UTIs, followed by *Proteus spp*. *Staphylococcus saprophyticus*, *Klebsiella spp*. and other *Enterobacteriaceae* pathogens (Öztürk & Murt, 2020).

According to statistics presented by Flores-Mireles and other co-authors, uro-pathogenic E. coli is the primary type of bacteria causing urinary tract infection in both uncomplicated UTI and complicated UTI category with a percentage of 75% and 65% respectively. *K. pneumonia*, *S. saprophyticus* and *Enterococcus spp.* is the next large group of bacteria resulting in infection in urinary tract, that accounts for approximately 20% of all incidences. Infections caused by other groups of bacteria such as group B *Streptococcus*, *S. aureus*, *P. mirabilis* and *Candida spp*. comprise a small percentage of the overall prevalence (Flores-Mireles, Walker, Caparon, & Hultgren, 2015). Details of pathogenic statistics are illustrated in Figure 1.

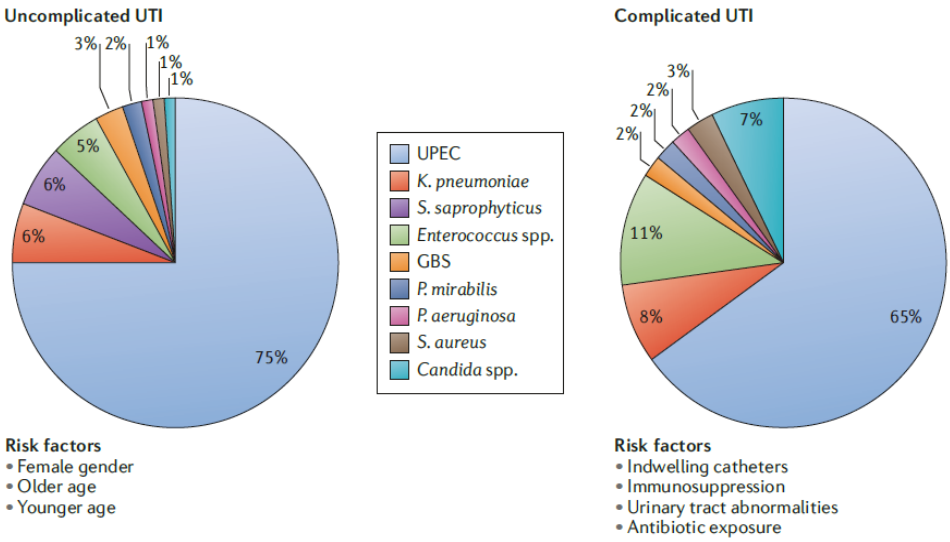


Figure 1: Epidemiology of urinary tract infection (Flores-Mireles, Walker, Caparon, & Hultgren, 2015, p. 270)

2.4 Risk factors

Certain groups of people can be more prone to urinary tract infections than others. This is influenced by many factors. Some factors are unmodifiable such as gender and age, while other factors such as catheter use and altered body functions can be improved by medication and treatment.

2.4.1 Gender and aging

Women are more susceptible to UTI due to short urethra and proximity between the opening of the urethra and anus. This allows bacteria to easily migrate into urinary tract and eventually cause infection. Pregnancy and use of diaphragm as a birth control method also increase the risk of UTI. In terms of age group, the incidence of UTI among older adults tends to increase. Factors contributed to this upsurge are down to higher risk of urinary stasis, chronic disease conditions, and altered immune responses (LeMone, Burke, Bauldoff, & Gubrud, 2015).

It is known that UTI are more common among women due to the short urethra and the proximity of the urethra to the anus. That allows bacteria to easily migrate to the urinary tract and cause infection. The risk is greater for women after the menopause. At this phase

of life, the level of estrogen in the vagina and urethral area decreases significantly. As a result, the capability of lactobacillus bacteria to protect these areas against urologic pathogens also declines and weakens. Once being infected, treating UTI in post-menopausal women is challenging. Furthermore, the likelihood of recurrent infection is relatively considerable (Baker, 2018).

2.4.2 Catheterization

Catheter use poses a considerable risk for urinary tract infections. Catheter-associated UTI is regarded as the most reported healthcare associated infections (HAIs). The duration of the catheter in place is progressive correspondingly to the risk of contracting infection. Intermittent catheterization is recommended for those who have difficulty in urinating, instead of an indwelling catheter, which carries higher infection risk (LeMone, Burke, Bauldoff, & Gubrud, 2015).

Risks of CAUTI can be reduced with the consideration of the need for catheterization and aseptic technique.

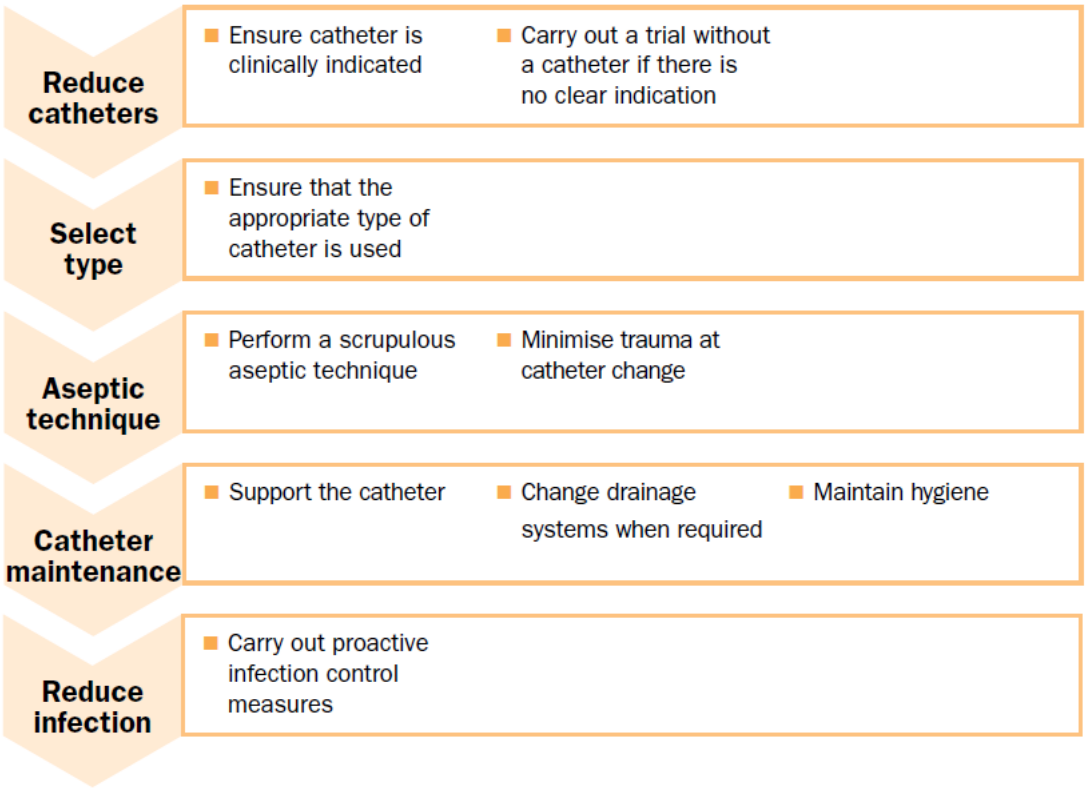


Figure 2: Five stages to reduce CAUTI (Nazarko, 2012, p. 578)

2.4.3 Health conditions

Urine incontinence, diabetes mellitus (DM), and chronic kidney disease (CKD) are among health conditions that increase the risk of conceiving urinary tract infections. This is because these conditions alter immunological functions, which lead to a higher rate of infection susceptibility (LeMone, Burke, Bauldoff, & Gubrud, 2015, p. 747).

Urine incontinence refers to a condition where urine is voided unintentionally. This storage and passing urine disruption does not cause infection itself, however, urine leakage, for example, after surgical interventions can lead to UTI. The voiding disorder derives from over-relaxed muscles and uncontrolled bladder spasms. Incomplete urine expulsion can also trigger recurrence of UTI if the person has a history of infection in the past (Storme et al., 2019).

Besides, the presense of DM and CKD is a threat for the development of UTI. People with DM bear upto twofold higher risk of infections compared to those without. Statistics show that approximately 8.2% of diabetic patients contract UTI on yearly basis and one third of these cases are recurrent UTI. The existence of CKD also impairs immunity system and weakens the body's defense mechanism. It is claimed that the frailty status as complications of DM and CKD allows infections to develop at a more significant rate. Therefore, a decrease in frailty level would lower the risk of UTI and contribute to positive outcomes in UTI management (Chao, et al., 2021).

2.5 Diagnosis

Urinary tract infections can be detected thanks to a variety of laboratory tests. *Urinalysis* is a urine test to examine urine sample visually, or to detect the presence of bacteria by using a urine nitrite dipstick. To ensure an accurate test, urine should be collected with mid-stream specimen. *Gram stain of the urine* is used to determine what type of bacteria is causing the infection, whether it is a gram-positive or gram-negative organism. *Urine culture and sensitivity* is another diagnostic method. The purpose of this urine test is to identify the right and most effective antibiotics. The result of urine culture takes up to 72 hours to arrive; however, many cases are given treatment immediately to eradicate the most common pathogens. Changes in white blood cells and neutrophils also indicate the occurrence of infections in our body. An increase in the number of neutrophils implies that the body has an infection. This method is called *white blood cell with differential* (LeMone, Burke, Bauldoff, & Gubrud, 2015).

For accurate diagnosis, there needs to be awareness of distinction between asymptomatic and symptomatic UTI. Asymptomatic UTI refers to a health condition where urine contains bacteria (bacteriuria), but symptoms do not appear in the patient. Researchers have investigated and concluded that a further positive culture of uro-pathogens is needed for the patient with asymptomatic bacteriuria to be confirmed the presence of infection in urinary tract. If asymptomatic UTI is left untreated, it allows symptomatic bacteriuria to occur. In other words, asymptomatic UTI is a result of an infection caused by bacteria where symptoms of infection are absent. At this stage, uncontrolled infection might develop into more severe symptomatic UTI, and even sepsis and shock (Vasudevan, 2014; LeMone, Burke, Bauldoff, & Gubrud, 2015).

UTI is claimed to be over-diagnosed and over-treated. This can be hazardous as it exposes a person unnecessarily to antibiotic therapy. This can be harmful to the individual and can lead to the development of multi-resistant organisms and the risk of Clostridium difficile (Nazarko, 2012). Hence, diagnosis of UTI is crucial, especially in nursing home setting where UTI manifestations among elderly people may differ. McGeer and the co-authors developed diagnosis criteria of UTI in long-term care facilities which concluded that a resident, excluding those with an urine catheter, is confirmed as positive UTI contraction when at least three of the following symptoms are present, namely fever higher than 38°C or cold, burning sensation when urinating, suprapubic pain, changes in urine appearance, and changes in mental health conditions (Rowe & Juthani-Mehta, 2014).

2.6 Treatments and prevention

Once infection is diagnosed, antibiotics can be prescribed to eliminate pathogens. An acute uncomplicated infection, for example, a low urinary tract infection in women can be treated with a short course of antibiotics, approximately 3 days. The choice of antibiotics varies from *ciprofloxacin* (Cipro), to *ofloxacin* (Floxin) and *levofloxacin* (Levaquin, Quixin). For pregnant women, commonly prescribed antibiotics are ampicillin and cephalosporin which are safe to use during pregnancy. Complicated UTIs require a longer period of treatment, normally 7-10 days (LeMone, Burke, Bauldoff, & Gubrud, 2015).

Preventive measures are important to avoid recurrence of UTIs. Sufficient fluid intake ensures regular urination which helps flush out bacteria before infection occurs. It is crucial to keep the genital area clean. Girls should be taught to wipe from front to back and try to void after sexual activity. When there is a need to urinate, it is useful not to hold it. The

bladder should be emptied every 3 to 4 hours. Women approaching menopause are recommended to use hormone replacement therapy due to the decrease in estrogen level (CDC, 2021; LeMone, Burke, Bauldoff, & Gubrud, 2015).

2.7 The nurse's role

Nurses play an important role in infection assessment and conducting nursing diagnosis. Nurses are trained to recognize the symptoms of UTI and identify the existence of infection in the patient. Once infection has been confirmed, nurses will then send referral to the doctor in charge for further examination and appropriate treatments. The significant role of a nurse in UTI management is to perform a thorough nursing assessment of symptoms. A comprehensive background knowledge of the infection and its manifestation enhances the probability of identifying UTI through nursing diagnosis, and patient education to recognize the presence of infection in early stage (Collins, 2019).

LeMone and the co-authors (2015, p. 752) emphasizes on sufficient treatment and elimination of the infection as the priority of nursing care. Nurses with other members in the care team play an important role in patient-teaching, which aims at preventing recurrence of UTI in the future. Besides, nursing care involves control of urinary elimination to ensure patient's relief and comfort.

In elderly care settings, the nursing role focuses on diminishing the risk for UTI. Aging is accompanied by suppressed immune system, increase in pH level in the urine promoting favorable culture for bacteria to develop and proliferate. Moreover, dementia, which is relatively common among the elderly, makes it more difficult to diagnose infections. Therefore, senior citizens are more prone to infections that might challenge nurses in taking care of them. Patient-teaching emphasizing on increased fluid intake, improved personal hygiene, and recognizing infectious symptoms or changes in urine color is the nurse's primary role in caring for older adults (LeMone, Burke, Bauldoff, & Gubrud, 2015, p. 752).

3 Aim and Research Questions

The aim of this research paper is to gain better knowledge of the nurse's role in interventions and prevention of Urinary Tract Infection (UTI) among elderly women in nursing homes. This will help deliver good care and ensure patient safety, also to improve quality of life among this group of people. Therefore, research questions are:

1: What can nurses do to prevent occurrence of UTI in elderly women?

2: What is the nurse's role in management of UTI among elderly women?

4 Theoretical Framework

The fundamental and primary role of nurses is to take care of the patient. Caring is understood in different points of view and is developed into various theoretical models. Theory of Caring by Kristen M. Swanson is among these frameworks and is going to be discussed as theoretical foundation for this research paper.

4.1 Kristen M. Swanson: Theory of Caring

Kristen M. Swanson was born in 1953 in Providence, Rhode Island, USA. She graduated from a nursing college in her hometown and started her career as a registered nurse at the University of Massachusetts Medical Center in Worcester. She later pursued a master's degree in nursing in 1978 and carried on with a PhD in the nursing field. Her theory is influenced by several nursing theorists such as Dr. Jacqueline Fawcett whose doctrine focuses on the conceptual basis of nursing practice, and Dr. Jean Watson, who developed Theory of Human Caring which inspired Swanson on delving into the concept of caring in her theory (Alligood, 2014, pp. 688-700).

The Theory of Caring is based on the Caring Model, which covers five fundamental concepts: *knowing, being with, doing for, enabling*, and *maintaining belief*. These concepts set the foundation Swanson's middle-range Theory of Caring in 1991. Swanson stated that *"Caring is a nurturing way of relating to a valued other toward who one feels a personal sense of commitment and responsibility"*. Caring depicts the nurse-client relationship, in which the caring person exhibits interests and commitments to perform caring actions to the person in need of care. The first stage in the caring process is *knowing*, which involves the effort made to understand a life event of the other person based on critical thinking rather than drawing assumptions. The process of knowing relates to the mutual understanding between the two parties, but the focus is on the person cared for. The next stage in the structure of caring is the process of *being with*. It regards the present and empathy of the caring person, to be there and share feelings with the one who is cared for. The process of *doing for* is established when caring actions are performed. These actions involve supporting physically and mentally through hard life events, showing empathy, providing suggestions, explaining things, and giving evaluation. Caring interventions enable the client to build a pathway through critical circumstances. That is the meaning of the process of *enabling*. Furthermore, the concept of *maintaining belief* constitutes an important segment in the whole process of caring. It is crucial to sustain belief and trust in a person's capability to overcome

tough life events and look forward to a meaningful life to come. Having a positive attitude, building confidence, and supporting in seeking for substantial sense of life. These concepts do not act individually but link to each other and establish the foundation for the development of each concept. The structure of caring is illustrated in the following figure, which clarifies each component of the caring process and its implication (Alligood, 2014, p. 690)

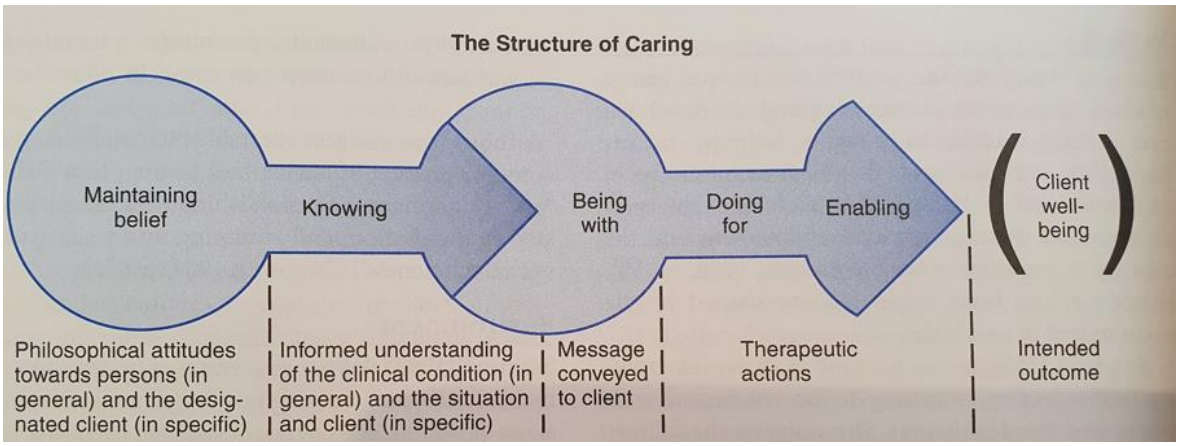


Figure 2: The Structure of Caring by Kristen M. Swanson (Alligood, 2014, p. 694)

Swanson's theory of informed caring was developed by clarifying four main nursing discipline concerns: *nursing*, *person/client*, *health*, and *environment*. These elements are considered the basis for her major assumptions. Nursing is defined as knowledgeable caring for others' status of health. Swanson affirms that nursing discipline arises from empirical knowledge and practical experience from nursing and other interconnected fields of study. Persons/clients are depicted as unique creatures who explicit own reflections, feelings, and actions as entirety. Nurses care for others but they also need to care for themselves and the immediate nurses. According to Swanson, health and well-being involves the wholeness of a being in all aspects, from thoughts, feelings, to intelligence, holiness, and imagination. Therefore, health is reflected as a sophisticated process of healing and curing. Additionally, environment indicates all surrounding situations and contexts that influence a human as wholeness. Above all, Swanson's Theory of Caring provides a theoretical framework for improving present nursing practice by viewing nurse-client relationship as wholeness process in healing and caring convention (Alligood, 2014, pp. 692-696).

5 Research Methodology

The research methodology chosen for this research paper is the qualitative research method focusing on systematic literature review. Data is collected via four scientific databases, namely CINAHL, EBSCO Academic Search Elite, GreenFILE, and MEDLINE, and analyzed with inductive content analysis approach.

5.1 Systematic literature review

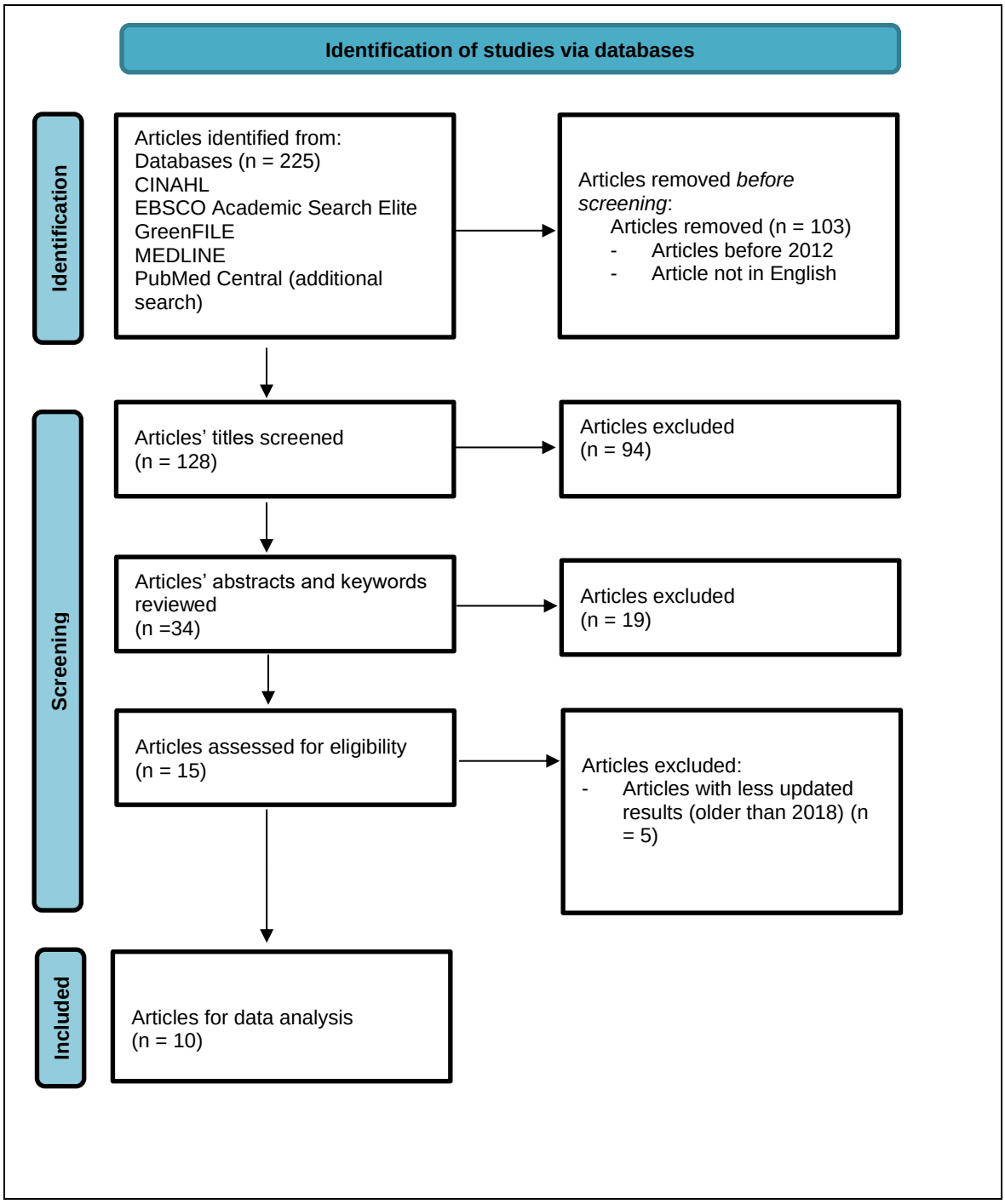
A systematic review is defined as an overview of research evidence related to a specific topic to answer research questions by using a chosen methodology to analyze and synthesize all relevant data on that given topic (Polit & Beck, 2021, p. 655). A systematic review is charactered as being *systematic*, *explicit*, and *reproducible*. The process of searching and selecting relevant literature is carried out systematically. Moreover, the aim and research questions, data collection, and choice of research methodology is clearly stated in advance. The research is reproducible in terms of its research methodology and research outcomes (Gerrish & Lathlean, 2015, p. 336).

5.2 Data collection and sampling

To this research paper, literature search is carried out in CINAHL where it is permissible to combine several databases. This function is helpful in eradicating duplication of research articles found. The cross-sectional databases comprise CINAHL, EBSCO Academic Search Elite, GreenFILE, and MEDLINE. Since these are electronic literature resources, Boolean operators are utilized to ensure the most suitable searching results. *Boolean operators* are simple words like AND, OR, and NOT which are used to expand or limit a search (Polit & Beck, 2022, p. 93). Searching keywords include *urinary tract infection* AND *(nursing interventions* OR *nursing care).* Searching criteria such as full-text and peer-reviewed are also employed. The search revealed 223 hits ranged from 1985 to 2022. The results were further limited to English language and publication between 2012-2022 period with the focus on English literature sources and contemporary nursing care. The number of hits were brought down to 128 articles, of which 15 articles were chosen after title screening and content skimming. To ensure the quality of this research paper, only recently published articles within the last five years from 2018-2022 were chosen for data synthesis.

Data for analysis comprises of 10 articles, of which the majority were published within the last two years. Furthermore, all articles used for data synthesis are peer-reviewed. In other

words, credibility and validity of these articles are assured. The primary search resulted in 225 articles which were potentially eligible for data analysis. These articles were screened according to the titles, and the appropriateness of abstracts and keywords provided. Eligibility criteria were determined according to PICO framework suggested by Pilot and Beck. PICO stands for Population, Intervention, Comparison and Outcome, which is a format used for searching evidence (2022, p. 16). The inclusion and exclusion criteria of the selection of research data are summarized in the PRISMA chart below.



5.3 Data analysis - Content analysis

In qualitative research, data analysis aims at making sense of collected data by organizing, structuring, and interpreting core meaning of data. The qualitative analysis process is regarded as being complicated and creative. In other words, data is accessed and reviewed several times to distinguish the meaning of the data. First and foremost, the process is initiated by reading data/precoding. Precoding starts already when collecting data by underlining significant concepts or aspects that can be useful for data analysis according to researchers' point of view. Then, the researchers develop a coding scheme where codes are used to identify meaningful information in a data segment. Coding is an important tool in data management and its result usually provides insights to the data analysis. The next step is to group significant codes into categories to develop themes by synthesizing data. The qualitative analysis processes move from the particular/ concrete concepts to the broad/ abstract concepts to explore a new dimension of the specific data (Polit & Beck, 2021, p. 537).

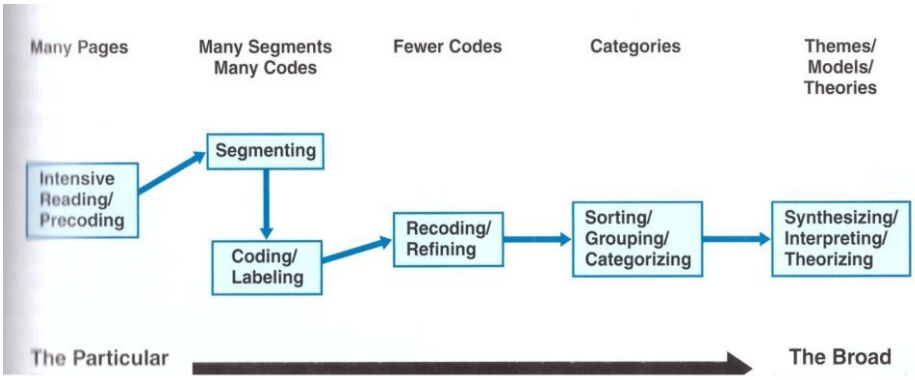


Figure 3: Broad overview of qualitative analysis processes (Polit & Beck, 2021, p. 537)

Qualitative content analysis, according to Polit & Beck (2021), is *"the analysis of the content of narrative data to identify prominent themes and patterns among the themes"* and is often used in descriptive qualitative research. The processing of data involves breaking down data into smaller units to identify meaning units, which are defined as words or phrases containing significant information connected to each other through their content and context. These meaning units are called codes – the basic for establishing categories (Polit & Beck, 2021, p. 557).

Elo and Kyngäs (2008) summarized main phases in the content analysis process in two directions: inductive approach and deductive approach. For the suitability of this thesis,

inductive content analysis is utilized to reach research findings. The process is illustrated as follow:

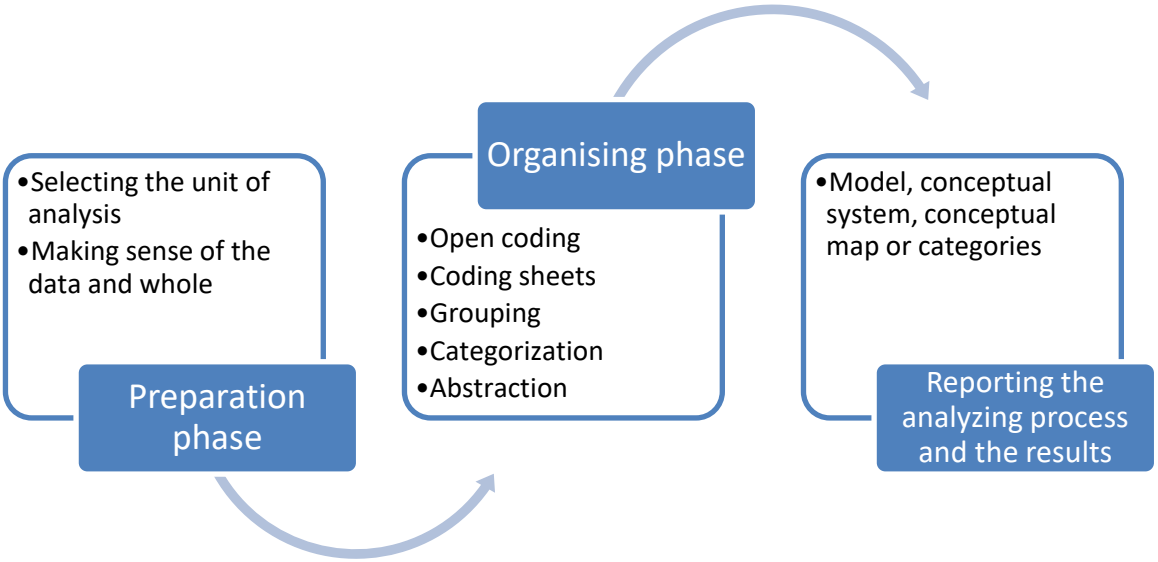


Figure 3: Preparation, organizing and resulting phases in the inductive approach of the content analysis (Elo & Kyngäs, 2008, p. 110)

Inductive approach can also be called "bottoms-up" approach, where regularly appeared data units are collected to discover meaningful concepts (Polit & Beck, 2021, p. 535) In this approach, the content analysis process consists of three steps: preparation, organizing and presenting the results. In the preparation phase, data are gathered to address significant information at a broad scale. The next step is to locate substantial data segment in relation to the topic in question. This phase is known as coding schema and each meaningful phrase or sentence is called a code. Codes are then grouped into categories and named usually with abstract concepts. The final stage is to represent analyzing process and disclose the results (Polit & Beck, 2021, p. 538; Elo & Kyngäs, 2008, p. 109).

5.4 Ethical Considerations

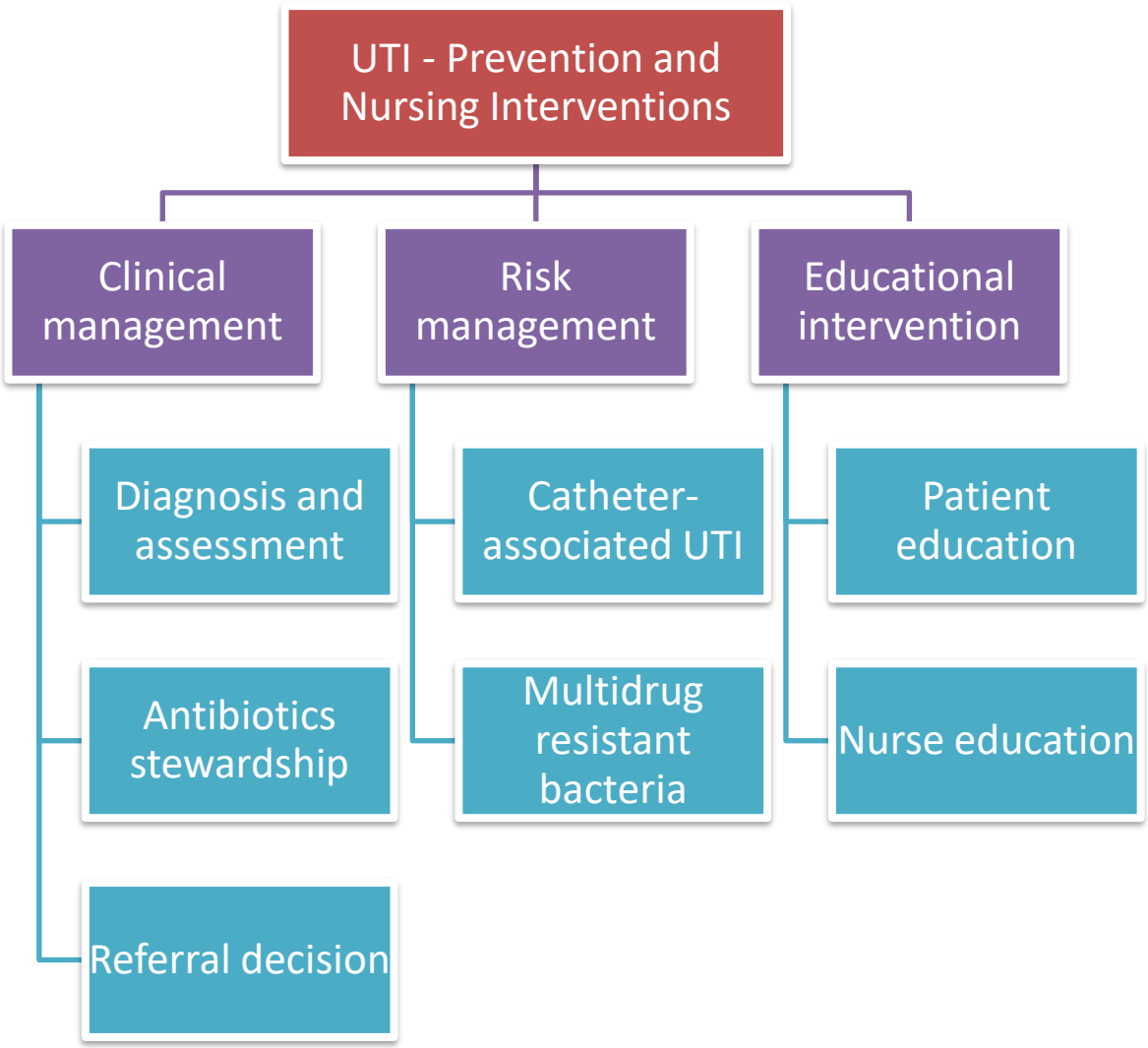
Nursing research involves conducting studies with human beings; therefore, research is required to be handled ethically. Research conduct must assure public trust by avoiding fabrication, falsification, and plagiarism. *Fabrication* indicates the action to create fraudulent analytical data and fictitious research findings. *Falsification* relates to

intentionally falsifying materials and misrepresenting study results. *Plagiarism* involves the exploitation of other authors' words, findings, and notions (Polit & Beck, 2021, p. 147).

In Finland, the organization who is responsible for promoting and managing research ethics is the Finnish National Board on Research Integrity TENK. In 2012, TENK published *Responsible Conduct of Research* providing guidelines of ethical conduct of research and procedures for dealing with misconduct in Finland. The principle of *Responsible Conduct of Research* is to ensure research integrity meaning that the researchers show honesty, accuracy and responsibility in planning and performing research. Unethical behaviors and dishonest practices such as falsification and plagiarism will violate the principles of *Responsible Conduct of Research* (Finnish National Board on Research Integrity TENK, 2012).

6 Results

The outcomes of this research paper are drawn from data synthesis of 10 articles. Details of these articles can be found in Appendix 1. Results can be summarized in the diagram below.



6.1 Clinical management

Clinical management plays an important role in nursing practice to control and minimize the risk of infection. Effective diagnosis and assessment enable appropriate treatment plans and reduce misuse of antibiotics. Besides, accurate referral decision-making helps decrease pressure for hospitals and avoids unnecessary hospitalization for residents in nursing homes.

6.1.1 Diagnosis and assessment

Khatri and Burrows (2021) stated in their study that the prevalence of asymptomatic bacteriuria is relatively among the elderly. The research also revealed that among presumed

UTIs, merely 13.5% of cases were confirmed to be positive. As a result, UTI may be over-diagnosed and over-treated. The consequence is even more severe when antibiotic misuse aids the increase of multi-drug resistant microorganisms. The most common reasons for prescribing short-course antibiotics are positive urine dipstick, mental health changes, and abnormal urine appearance. Mostly, women are prescribed a longer antibiotic course than recommendations. It is advisable for nursing staff to recognize genitourinary symptoms than to predominantly depend on urine testing results and non-particular symptoms (Khatri & Burrows, 2021).

Urine testing clearly plays a key role in UTI diagnosis. However, research revealed that health care providers are over-reliant on urine analysis and often prescribe a longer course of antibiotics than necessary. Moreover, management of UTI is mostly based on unscientific knowledge and previous practice. Unnecessary urine testing leads to inappropriate prescription of antibiotics for asymptomatic bacteriuria and excessive costs (Pinkerton et al., 2020).

UTI diagnosis in nursing homes is a challenge for nursing staff since there is a high incidence of asymptomatic bacteriuria in this group of people. One explanation for this issue is that obtaining midstream urine samples can be an obstacle for the elderly. It often leads to samples with mixed flora (Khatri & Burrows, 2021). Furthermore, those residents with cognitive deterioration have difficulties in describing their symptoms, of which certain symptoms are non-specific. Therefore, in nursing home settings, accuracy of urine tests such as urine dipstick and urine culture is questionable. To support detecting UTI in nursing home residents, C-reactive protein (CRP) and procalcitonin (PCT) are used to aid UTI diagnosis. These inflammatory markers taken in point-of-care testing (POCT) play a role in recognizing residents with infections, however, the implementation of these supportive tools to identify UTI in nursing homes requires more attention. Research pointed out that POCT marginally increased certainty of UTI diagnosis in residents who did not show any specific symptoms. The pitfall of these diagnostic instruments is that even though they can confirm the presence of infection, more diagnostic methods are still needed. Since positive markers might be the result of other inflammatory diseases. Therefore, it is necessary to diagnose UTI with a combination of test results and clinical reasonings to avoid "*a false sense of confidence*" (Kuil et al., 2020).

6.1.2 Antibiotic stewardship

Management of antibiotics is a global health issue and antibiotic stewardship faces more challenges in nursing home settings, where residents are more susceptible to infections due to deteriorated immune systems and frail general conditions. Uncontrolled use of antibiotics for the elderly poses the risk for antibiotic resistance and increases health care costs. Therefore, effective management of antibiotic use not only ensures patient safety and quality of care, but also reduces financial burden for health care systems. It involves many processes in nursing practice, from diagnosis, decision-making on prescription, to implementation of treatment plan (Shane, 2021).

As a characteristic of nursing homes, medication is prescribed by third-party physicians, who have no direct contact with the residents. Prescribing procedure is based on nursing diagnosis and assessment, and results from urine testing (Shane, 2021). Hence, accurate diagnosis of infection improves prescribing process and avoids overuse of antibiotics among the elderly. This nursing practice also helps prevent antibiotic resistance from growing further into a global health issue in elderly care settings (Kousgaard, Olesen, & Arnold, 2022). Research has shown that antibiotic prescribing relies mainly on urine testing and previous practice, especially in the case of UTI recurrence, which leads to the consequence that treatment is prescribed inappropriately. Clinical guidelines and susceptibility data have not been utilized sufficiently in decision-making for antibiotic selection (Pinkerton et al., 2020).

6.1.3 Referral decision

In nursing home settings, registered nurses oversee care for the residents. If a resident is suspected of UTI and medical attention is required, it is the registered nurse's responsibility to refer the case to hospitals. However, there are factors that affect the nurse's decision to forward the incidence for further examinations and remedies at the hospitals. Research analysis carried out by Kosheleva and Ngune (2020) pointed out that determinants namely deviant vital signs, earlier history of falls, and co-existing diseases such as diabetes and kidney disease, influence a resident's hospitalization decision-making. Among those influential factors, changes in vital signs are the most conventional indicators for nurses to take the decision. Besides, being females contributes to a higher rate of hospital referrals. The tendency is similar in the case of having a history of past falls. In addition, comorbidities such as diabetes and urological diseases impact further the nurse's clinical judgement and reasoning for a resident to be referred to the hospital (Kosheleva & Ngune, 2020).

Nurses play a role in improving quality of care and minimizing the likelihood of hospitalization among nursing home residents. This role is fulfilled if nurses acquire sufficient clinical knowledge and skills. Moreover, nurses are also in need of guidance and standardized procedure. As an illustration, it is helpful for nurses to make referral decision if there are protocols guiding them how to proceed with a specific situation. Additionally, residents' health history is advisably documented in care plan so that all members in the care team are capable of recognizing changes in general health conditions among the residents. Such interventions allow easy access to the residents' clinical background and care progress. The aim is to achieve better diagnostic results with higher accuracy and avoid unnecessary referrals to the hospital (Kosheleva & Ngune, 2020).

6.2 Risk management

As mentioned earlier in this paper, the use of urine catheter and the expose to multidrug resistant bacteria pose significant risks to the occurrence of UTI. This chapter deals with nursing interventions in relation to management of risk factors. Effective risk management ensures high quality of care and comfort for residents in nursing homes.

6.2.1 CAUTI

The use of urine catheter is accompanied by a higher risk of healthcare-associated infections (HAIs), including UTIs. Since the rate of UTI is relatively tremendous in nursing home settings, infection prevention is considered as a priority. It involves a safe procedure of catheterization and aftercare. Research has recently been focusing on interventions for CAUTI in hospital settings while CAUTI management for nursing home residents remains understudied. Smith and other members in the research team (2018) examined the collaboration between safety culture and infection prevalence of CAUTI in the nursing home context. Safety culture was measured by the Nursing Home Survey on Patient Safety Culture (NHSOPS). Despite a significant decrease of 52% in infection rate during the period of implementation, collected data pointed out that there was no precise connection between patient safety culture records and CAUTI rates. In other words, improvements in patient safety culture did not ensure a decline in infection rates. The research also suggested that effective infection control relied primarily on technical determinants such as standardized procedures for urinary catheterization in all steps, from insertion, maintenance, to removal (Smith, et al., 2018).

Besides, the use of catheters among nursing home residents influences antibiotic stewardship in this context. When a resident using a catheter has UTI, it is usually recommended that a longer course of antibiotics should be prescribed. However, studies found out that there is no evidence for such differences in treatment duration. As an illustration, for women without catheters, a three-day course of trimethoprim is normally recommended while women using catheters with confirmed infections have a therapy period of up-to 8 days. This indicates a need for reviewing the duration of antibiotic usage among those with urinary catheters (Khatri & Burrows, 2021).

6.2.2 Multidrug resistant bacteria

UTIs have been seen facing more difficulties in treating out-patient infections in the last decade. It is claimed to be caused by an increase in resistance to prevalent antibiotics and a rise in multidrug resistant infections (Pinkerton, et al., 2020). Multidrug resistant (MDR) bacteria accounts for a large percentage of causes of UTI in both healthcare settings and community-acquired context. This increasing source of infection results in treatment failure at a higher rate. MDR bacteria has a moderate clinical impact on older residents, whose UTI onsets occurred on a community basis, but treatments were provided at the hospital. MDR bacteria leads to a more significant Inadequate Empirical Antimicrobial Therapy (IEAT) and a longer period of hospitalization. IEAT, in the case of UTI, signifies ineffective antibiotic remedy as treatment against infections. Research findings revealed that MDR bacteria did not have any specific connection to mortality rate in any setting. Furthermore, being residents in nursing homes did not bear a risk for MDR bacteria, so as having antimicrobial treatment in the past. It also urged for the need to view residents with a person-centered approach (Madrazo, et al., 2021).

6.3 Educational intervention

Educational interventions are not only substantial for patients/residents, but they also benefit nursing staff in improving clinical knowledge and reasoning in the regard of UTI management. Education intervention is seen as an investment in enhancing quality of care and achieving positive health outcomes in the long-term prospect.

6.3.1 Patient education

Previous studies have paid more attention to the clinical management aspect of UTI and patients' perspective is still an inadequately discovered subject. Grigoryan and the co-writers (2022) implemented recently a study focusing on the emotional impact of UTIs in women. Patients' experiences in the findings are a source of reference for the purpose of patient education and to enhance mutual understanding between patients and nurses. The study disclosed that patients with uncomplicated UTIs (uUTIs) experienced negative moods with all the pressure from manifestations and interruption in daily life activities during the period of infection. Women with urinary infections became frustrated and worried of treatment failure and the risk for UTI recurrence (Grigoryan, et al., 2022).

Additionally, a lack of scientific information about infections and the accompanied symptoms affected pessimistically the way a person perceives his/her health condition. Therefore, patient education interventions call for the need to improve patients' knowledge of the infection and its relevant elements. Better understanding of the disease also bridges the communication gap between patients and doctors in searching for a common voice about treatment plan and improvement in health outcomes (Grigoryan, et al., 2022).

6.3.2 Nurse education

Adequate education and training for nursing staff on prevention and timely diagnosis allows infection rates to decrease. Viner and Gautam (2020) tested the hypothesis that educational interventions would strengthen nursing staff's knowledge of UTI in nursing home settings. Data for analysis were collected through questionnaires which were designed to reflect benefits gained from a UTI-specific educational program. As a result, the final assessment exhibited an increase in the nursing staff's knowledge in UTI prevention. Moreover, the results also demonstrated a reduction of 5% in the number of confirmed cases of UTI. This achievement led accordingly to a decrease in antibiotic use to treat UTIs. The findings also suggested the coalition between the effectiveness of the educational intervention and the educational level of nursing staff. This finding calls for the need to individualize material for educational interventions and consider the benefit of involvement of other members in the care team, for example, nursing assistants and rehabilitation professionals (Viner & Gautam, 2020).

The significant role of educational nursing intervention is further confirmed as an appropriate approach to optimize clinical management in nursing home settings. Accurate

assessment and effective management of UTIs constructs the foundation for the implementation of antibiotic stewardship programs in nursing home environments. To achieve effective assessment and diagnosis, nursing staff should be educated about how to recognize urogenital symptoms and their manifestations to avoid excessive reliance on urinalysis results (Khatri & Burrows, 2021).

Educational interventions, likewise, appeared to be potent in the case of antimicrobial stewardship. An experiment on the effectiveness of eLearning module education on antimicrobial stewardship was implemented for nursing staff in nursing home milieu. The content of eLearning module covered the definition of antimicrobial resistance, difference between UTI and asymptomatic bacteriuria, different diagnostic tests, and core components of antibiotic stewardship program. Subsequently, the eLearning module potentially strengthened nursing staff's understanding of the current evidence-based guidelines of suspected UTI among residents in nursing home circumstances. In other words, the intended antimicrobial stewardship education showed beneficial impacts on nursing staff's level of knowledge (Shane, 2021). Kousgaard with two other researchers, Olesen and Arnold, (2022) shared the same point of view on the potential of education-based interventions targeting nursing homes' care team. Continuing education activities changed the nursing staff's attitude towards UTI and acknowledged the need for a more compatible approach to reduce antibiotic use to treat suspected UTI in nursing home residents (Kousgaard, Olesen, & Arnold, 2022).

It would be a shortcoming not to mention the effective role of education intervention that established the foundation for the development of evidence-based checklists for catheterization as a preventive measure for infection control (Smith, et al., 2018).

7 Discussion

This chapter discusses different angles of research findings and the connection of the results with the chosen theoretical framework. This chapter also discusses the research methodology that guided data synthesis to the findings. Despite limitations, this paper discloses suggestions for the prospect of potential future research.

7.1 Result discussion

Present literature continues to affirm clinical management of assessment and diagnosis as the dominant component of nursing interventions for UTI. The importance of clinical competence is validated over time. Accurate and timely assessment and diagnosis of UTI lower the risk of infection contraction and avoid over-use of antibiotic therapies. Besides, research findings of this paper emphasize the importance role of continuous education, both for nursing staff and patients themselves, which are persistent with results from previous research. The necessity of educational interventions remains accurate in the current situation.

Research findings unfold the interrelationship among diverse interventions. Continuing education for nursing staff can improve the development of accurate and timely diagnosis. Thanks to that, inappropriate use of antibiotics is reduced. Educational interventions are also intrinsic in promoting patient safety and securing clients' life quality.

Moreover, the results of this study explain the relevance of selected theoretical framework as an essential supporting constitution for developing nursing interventions. Nurses have commitment and responsibility for the well-being of the residents. Once affected by UTI, nurses are accountable for treatment therapies and follow-up with recovery progress. In this sense, nurses are placed in the role of *caring*. The effort to learn and understand residents and their circumstances builds the engaging relationship between the caring and the cared for in the process of *knowing*. When taking residents' perspectives and preference into consideration, it involves shared feelings between both parties – a sign of *being with*. Implementing nursing interventions, understanding the needs of care, protecting are what nurses are *doing for* the clients. Nurses also help clients *maintaining belief* and find meaning of life, support *enabling* capacity to overcome challenging circumstances.

In answering for the research question 1, the nurse's role in prevention of UTI occurrence involves effective management of infection risk factors, such as CAUTI and minimize exposure to multidrug resistant bacteria. Nurses are expected to actively deepen knowledge

of the infection and improve clinical competence. Furthermore, better mutual understanding between clients and nurses ensures a collaboration of decision-making on finding an appropriate and insightful care plan.

Arguments for research question 2 are placed on clinical management and the implementation of nursing practice. Nurses play an active role in improving clinical competence for better management of disease. Clients should be seen and cared for as wholeness of human beings. Nurses are responsible for collaborating singular interventions and connecting them with clients' preferences and values. The interrelationship among nursing interventions is proximate. Clinical competence achieved through nursing education allows effective diagnosis of infection, appropriate decision-making in hospitalization referral, and efficient management of antibiotic use. The outcomes are patient safety and satisfaction, and also cost saving as a result of reduction in antibiotic use and reduced rate of hospitalization.

Limitations of the Study

Findings of this research paper have principally targeted UTI as an individual infection and disease. Even though the results cover a relatively large area of nursing interventions, from clinical management, risk control, to holistic care with clients' perspectives and nursing roles in focus, there is still a need for viewing UTI with other comorbidities. There is, in addition, still a lack of information in gender-oriented interventions, for example, interventions for UTI management among post-menopausal women. Another limitation of this study is the possible generalization of research findings since data is analyzed with the author's subjective point of view. As a result, the risk of being biased might be present to some extent.

7.2 Method discussion

Each research methodology has its own criteria for quality appraisal. Polit and Beck cited Lincoln and Guba's quality criteria as the "gold standard" for scrutinizing trustworthiness and integrity in qualitative analysis. Lincoln and Guba's framework was primarily developed in 1985 and originally consisted of four criteria: *credibility*, *dependability*, *confirmability*, and *transferability*. As a response to the maturation of their viewpoint, an additional criterion was incorporated in 1994, namely *authenticity*. *Credibility* indicates the confidence in the truthfulness of the chosen data and research results are possible to believe in. *Dependability*

refers to the reliability of data over the course of time and contexts. *Confirmability* indicates that the value of data should be based on concrete arguments, not by researchers' imagination and false interpretations. *Transferability* refers to the relevance of the findings in other contexts. *Authenticity* of an inquiry provides readers a sense of reality, to observe and feel the realities being portraited. (Polit & Beck, 2022, pp. 275-289).

This paper, first and foremost, has closely followed the structure and process of qualitative research. Chosen data for analysis have high quality of being peer-reviewed and published on scientific journals. Besides, research results are based on arguments and findings of the chosen scientific data. Believability is relatively assured in this research paper. Research findings are drawn from the newest and most updated literature over the course of the last five years. The results are believed to remain their stability over time. Moreover, arguments in research findings are proven with facts and interpreted accurately according to the researchers' points of view.

Pilot and Beck (2022) also mentioned data and method triangulation as strategies to enhance quality in qualitative research. Data triangulation is associated with the use of various data sources to validate findings. This research paper involves mainly *person triangulation*. Data were collected from different perspectives, such as clients' preferences and nursing staff's attitudes. *Method triangulation* refers to the use of different methods in data collection. Diverse methodology was used to collect material for data synthesis of this thesis. It ranges from semi-constructed interviews, cohort prospective observational study, quantitative research, to longitudinal study design.

8 Conclusion

Management of UTI in nursing home settings depends enormously on knowledge and competence of nursing staff. Educational interventions play a key role in improving effectiveness of nursing practices in taking care of residents with suspected UTI. Interventions are ideally evidence-based and person-centered. Supportive tools, such as communication tool SBAR, reflection tool, are useful to overcome challenges in taking care of the elderly with UTI. Besides, there is also a need for therapeutic guidelines, standardized protocols, and education and training for nurses. In conclusion, nursing care and management of UTI among women in nursing home settings is a combination of comprehensive multifaceted interventions. The successful nursing management of UTI relies on effective utilization of evidence-based nursing practice and supportive tools with clients' preferences and values at the center.

Implications for Future Research

The impact level of catheterization on infection risk for UTI, particularly in nursing home settings, remains incompletely covered. In addition, the gender role is not clearly distinguished in the development of nursing interventions which reveals a gap in contemporary literature. More research should be carried out in these areas to present more optimal guidance and protocols for nursing care.

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Appendix 1: Overview of literature for data analysis

	Bibliographic data	Aim	Sample informants, material, context	Methods	Results
1	(Khatri & Burrows, 2021)	To measure how UTIs were assessed and managed in aged care settings compared with evidence-based practice and suggested remedy.	The population of the study included 452 clients who lived in 6 different aged care facilities. Data for analysis involved 74 cases of UTI that occurred for 3 months' time.	A retrospective clinical audit was chosen as study method. The audit was applied to all short-course antibiotics that were prescribed to treat presumed UTIs. The provision was McGeer criteria for infection.	87% of the prescribed short-course antibiotics followed recommendation for doses, while 85% was the percentage for frequency of the prescription. However, only 42% of the prescribed antibiotics adhered to the recommendation for the duration of the treatment.
2	(Viner & Gautam, 2020).	The aim is to test the hypothesis that whether educational intervention improves knowledge of UTI among nursing staff in a	Data were collected from 21 participants by filling out a questionnaire. All participants were at the time working at a long-term care facility	The method used was a longitudinal study design and a previously developed questionnaire, data were collected prior to and after an educational intervention	The results show an improvement in knowledge and prevention of UTI scores. Even though the results were not statistically significant, these data indicate a benefit from the implemented educational intervention.

		long-term care institution.		focusing specifically on UTI	Research findings call for reviewing clinical indicators and assessment variables. Results also confirm benefits of timely diagnosis and treatment which may improve the potentiality to decrease hospitalization rate and mortality in this care setting.
3	(Shane, 2021)	This research aims at examining the effectiveness of an eLearning module of antimicrobial stewardship education targeting nursing staff working in long-term care settings.	Data for analysis were collected via scientific databases such as PubMed, Ovid Medline, EBSCO Cumulative Index of Nursing and Allied Health Literature (CINAHL), and Cochrane	The study is a quantitative, quasi-experimental research with a pretest-posttest design.	Results suggested that the e-Learning module improved knowledge of nursing staff in long-term care settings. Outcomes additionally examined the role of the communication tool SBAR, while determining the focus was still on the adherence of nursing staff to antimicrobial stewardship strategies.

4	(Pinkerton, Bongu, James, Lowder, & Durkin, 2020)	The study examined how care givers and residents preserve UTIs clinically and discussed the future prospect of antibiotic stewardship strategies.	The authors conducted semi-structured qualitative interviews of community primary care providers (n = 15) and internal medicine residents (n = 15) in St. Louis, Missouri in the period of 2018–2019.	This is a semi-structured qualitative interview study. Materials were transcribed, reviewed, and coded by two independent researchers using a combination inductive and deductive approach.	Urine tests were often ordered to "confirm" presence of urinary tract infections. Antibiotic prescription decisions disregarded local susceptibility data and clinical practice guidelines. Antibiotics were often prescribed for a longer course of time than necessary.
5	(Kuil, Schneeberger, Leth, Jong, & Harting, 2020)	This study discussed health care givers' point of view regarding inflammatory marker Point-Of-Care Testing (POCT) in clinical management of UTI.	The participants included were physicians (n = 12) and nurses (n = 6) working in 13 nursing homes. The majority were not familiar with inflammatory marker POCT.	Semi-structured face-to-face interviews were conducted to reach research findings. The interview transcripts were analyzed with the reference of the Consolidated Framework	Adequately sensitive POCT only marginally reduced diagnostic uncertainty in residents with non-specific symptoms. Even with the help of POCT, most respondents were unsure how to carry on with the test result. With negative results, they were unable to explain lingering non-specific symptoms. With positive results, the new fear of

				for Implementation Research.	overlooking infections rather than UTI itself appeared. POCT was claimed to create “a false sense of confidence”.
6	(Madrazo, et al., 2021)	The study aims at identifying risk factors for MDR bacteria in the elderly with community-acquired UTI. This research also discussed clinical impacts of MDR bacteria.	The population of the research involves 348 patients, of which 41.4% contracted of UTI due to MDR bacteria.	This research is a cohort prospective observational study. Arguments were based on the comparison of epidemiological and clinical variables and outcomes in two groups of patients, those with UTI due to MDR and those with UTI due to non-MDR bacteria. Independent risk factors were analyzed using logistic regression.	Results saw a longer hospital stay in the MDR group and inadequate empirical antimicrobial therapy was considerable with a percentage of 23.3%. Moverover, prior antimicrobial therapies and the status of residence in a nursing home were claimed to be independent risk factors for MDR bacteria.
7	(Smith, et al., 2018)	The study examined the connection between safety	Research population is nursing staff from 196 taking part in answering	This research is a prospective cohort study.	During the intervention period, nursing homes had a reduction of 52% in CAUTI rates. However, results did not show

		culture, measured with the Nursing Home Survey on Patient Safety Culture (NHSOPS), and catheter-associated urinary tract infection rates (CAUTI).	the NHSOPS survey and reported CAUTI rates every month.		significant association between CAUTI rates and initial or over-time NHSOPS activities.
8	(Kosheleva & Ngune, 2020)	The aim of this research is to investigate what factors influence nurses' decisions to refer residents for further examinations.	Data were extracted from the electronic database and analyzed using descriptive and regression analysis. Approval was obtained from both the residential aged care facilities and University Human Research Ethics Committee.	This research used a retrospective cohort approach as research methodology. Data uses were reviewed electronic clinical histories of residents with UTIs.	Female gender, previous falls, related comorbidities, and abnormal vital signs are among the determinants that increase the possibility of hospitalization. Older age and the use of a catheter define a significant role for the decision of hospital referral made by nurses.

9	(Grigoryan, Mulgirigama, Powell, & Schmiemann, 2022)	This study discussed the perspectives of women with uncomplicated UTIs to understand their emotional preferences related to this type of infection.	The targeted population of this research was women aged over 18 years with experience of a least one uUTI and were prescribed antibiotics in the past year.	This was a qualitative, exploratory, in-depth interview-based study. The research settings are Germany and the US.	Women with uUTI experienced negative feelings throughout the course of infection, and that their daily activities were affected. Participants encountered a lack of accurate guidelines and recommendations related to infection. They also experienced a fear over treatment failure and recurrence of UTI.
10	(Kousgaard, Olesen, & Arnold, 2022)	The study explored the pros and cons of implementation of a complex educational intervention. The study also discussed the role of refection tools and communication tools to minimize the use of antibiotics in treatment for	The study involved 12 participants with different roles in the care teams. They were senior manager, registered nurses, nursing assistants, and care helpers.	Six nursing homes took part in the intervention. The staff were interviewed to generate data for this qualitative interview study.	The intervention changed the participants' perspectives on UTI and acknowledged the need for examining a different approach in caring for residents with suspected UTIs. The intervention, generally, had a positive impact on management of UTIs in this population. Research also addressed the implementation of reflection tools and communication tools to engage all members of the care team. Nurses played a substantial role in the implementation

		suspected urinary tract infections.			process which involved comprehensive clarification and discussion among all participants in the care team.