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Points criteria:

Criteria	Under performance <3 points per criteria	Basic 3 - 3.9 points per criteria	Proficient 4.0 - 4.4 points per criteria	Distinguished 4.5 - 5 points per criteria
<b>Required content objectives</b>	Content objectives are missing or sparsely covered.	Content objectives are not consistently addressed. Demonstrates minimal understanding of content.	Content objectives consistently addressed. Demonstrates understanding of content.	Content objectives consistently addressed. Demonstrates mastery of content.
<b>Academic writing standards</b>	Writing lacks scholarly tone & focus. Sparse content. Multiple grammatical, spelling, & factual errors. Reliance on bullet points rather than effective writing in speaker notes. 4 or more direct quotes per project.	Writing is unclear and/or disorganized. Inconsistent scholarly tone. Inadequate depth of content. Grammatical and spelling errors. No more than 3 direct quote of less than 40 words per project.	Writing demonstrates general exploration of content. Responses are clearly written using scholarly tone. Few grammatical and/or spelling errors. No more than 2 direct quote of less than 40 words per project.	Writing demonstrates comprehensive exploration of content. Responses are clearly written using scholarly tone. Rare grammatical and/or spelling errors. No more than 1 direct quote of less than 40 words per project.
<b>APA formatting</b>	References and citations have multiple errors or are missing.	References and citations have errors.	References and citations have few errors.	References and citations have rare errors.

**See course syllabus for reference requirements**

Using academic writing standards and APA formatting of references and citations, respond to each of the following learning objectives. Using this document, **enter your responses directly next to each objective listed below.** **Responses should be 150-350 words in length.** Be sure to carefully review the assignment rubric on page one for specific details on how this assignment will be evaluated for points. Save the completed document as the assignment title with your name, and submit to the dropbox.

1. Describe the incidence and prevalence of catheter associated urinary tract infection (CAUTI).

Healthcare-associated infections (HAIs) are infections that patients develop while in a healthcare facility, most often related to procedures or medical devices used to provide care (Centers for Disease Control and Prevention, n.d.b). The different types of infection are central line-associated blood stream infection (CLABSI), surgical site infection (SSI), ventilator-associated pneumonia (VAP), and catheter-associated urinary tract infection (CAUTI) (Centers for Disease Control and Prevention, n.d.b). A catheter is a thin hollow tube that is inserted into the bladder through the urethra or suprapubic region, allowing urine to drain continuously (Newman, 2022). A CAUTI is a type of complicated urinary tract infection (UTI) occurring in a patient that is catheterized or has been catheterized within the past 48 hours (Werneburg, 2022). It is believed that between 15% to 25% of hospitalized patients are catheterized during their admission (Centers for Disease Control and Prevention, n.d.a). In the United States, 80% of UTIs are related to urinary catheters (Werneburg, 2022). Furthermore, CAUTIs account for approximately 9% of all HAIs (Van Decker et al., 2021). This equates to about 1 million CAUTI cases every year (Werneburg, 2022). CAUTIs can lead to serious illness and even death. In addition to increased morbidity and mortality rates, CAUTIs are a significant financial burden to the American healthcare system. The estimated annual costs associated with CAUTs range from \$115 million to \$1.82 billion (Werneburg, 2022). It is reported that 65-70% of CAUTIs are preventable (Van Decker et al., 2021). Thus, focusing on preventive strategies is crucial for reducing CAUTI rates and improving patient safety.

2. List factors associated with the development of CAUTI.

CAUTI risk factors are continually being researched. Currently, age, female gender, diabetes, catheter insertion outside of the operating room, and prolonged catheterization time have all been identified as the major contributing factors to CAUTI development (Barchitta et al., 2021). Most of these can be considered as risk factors associated with standard UTIs. There is varying evidence regarding how and if increased age places the patient at higher risk. Of note, changes do occur in the lower urinary tract with aging. These include decreased urine flow, smaller bladder capacity, reduced detrusor muscle contractility,

and lower urethral closure pressure (Palmer, 2022). The ability to empty the bladder effectively and efficiently can also be impacted by age (Palmer, 2022). Other comorbid conditions commonly associated with aging are frailty, cognitive impairment, and reduced mobility (Palmer, 2022). All these aforementioned factors can lead to incontinence, retention, and/or other urinary symptoms, making older adults more vulnerable to getting UTIs. Diabetes mellitus is an endocrine disorder that causes polyuria which can contribute to urinary incontinence (Ermer-Seltun & Engberg, 2022). Additionally, the urine will contain higher amounts of glucose due to the lack of insulin in the body (Rubi et al., 2022). This negatively affects leukocyte function and provides an optimum environment for bacteria to thrive (Rubi et al., 2022). Generally, females have a higher risk of developing UTIs than men (Barchitta et al., 2021). This is presumably because of the smaller distance between the urethra and rectum (Barchitta et al., 2021). Additionally, women have a shorter urethra which allows pathogens to travel to the bladder more easily (Stanford Medicine, n.d.). Prolonged dwell-time of the catheter, meaning that the catheter is in place for more than six days, is the leading CAUTI risk factor (Newman, 2022). CAUTIs can develop from the formation of an infective biofilm on the surface of an indwelling catheter (Rubi et al., 2022). A biofilm consists of bacteria, host cells, and cellular by-products (Newman, 2022). When a urinary catheter is introduced into the body, it produces an immune response which leads to fibrinogen accumulation on the surface of the catheter (Barchitta et al., 2021). This is an ideal site for uropathogens to attach and multiply, forming a biofilm (Barchitta et al., 2021). Biofilm can also develop on the internal surface of the catheter from organisms that enter the drainage tubing (Newman, 2022). In both circumstances, the organisms are now able to access the bladder. The biofilm replicates quickly, and a larger biofilm burden can lead to bacteriuria, infection, and damage to the bladder epithelium (Barchitta et al., 2021). Bacteria can be transmitted from the drainage bag into the tubing and catheter secondary to urinary stasis if the bag is not emptied, a break in the closed system, or contamination of the bag (Newman, 2022). Additionally, bacteria on the skin near the urethral opening can migrate into the urinary tract with catheter movement (Newman, 2022). Other patient-related risk factors are poor hygiene, fecal incontinence, malnutrition, and incomplete bladder emptying (Rubi et al., 2022).

3. Discuss nursing evidence-based interventions for CAUTI prevention and management.

There are many nursing evidence-based interventions that nurses can institute in their practice. Research indicates that adhering to catheter removal prompts, nurse-driven catheter removal protocols, catheter alternatives, and insertion care and maintenance recommendations are effective at reducing catheter use and CAUTI rates (Werneburg, 2022). When given a written order for catheter insertion, the nurse should recognize the indication for catheterization and ensure that it is truly necessary. Guidelines for appropriate catheter insertion include postoperative and acute urinary retention, need for strict measurement of intake and output, wound healing, if the patient is immobile, and comfort for those nearing end of life

(Newman, 2022). Unfortunately, catheters are often inserted for unclear reasons (Newman, 2022). To avoid this, the nurse must be aware of the guidelines and potential complications with catheter use, including CAUTIs. Treatment alternatives are intermittent catheterization, external catheters, or incontinence products and toileting (Newman, 2022). In some situations, a bladder ultrasound can be done to avoid unnecessary catheterization (Newman, 2022). If catheterization is deemed necessary, aseptic catheter insertion technique must be used and hand hygiene should be performed before and after the procedure (Werneburg, 2022). While maintaining sterility, the nurse must try to minimize urethral trauma by using the correct type and size of catheter and lubricant (Werneburg, 2022). After insertion and securement, the bag should be kept below the level of the bladder and tubing to not impede urine flow and decrease the risk of bacteriuria (Werneburg, 2022). Minimal disruption of the closed urinary drainage system is helpful in reducing infection risk (Newman, 2022). The nurse should assess the amount of drained urine and empty the bag if it contains more than 400 mLs (Newman, 2022). Routine perineal hygiene should also be performed. Typically, long-term indwelling urinary catheters (IUCs) are removed and replaced every 30 days, but it is debated whether catheter change frequency has an impact on preventing complications (Newman, 2022). For the acutely catheterized patients, however, the nurse should frequently assess the patient's need for a catheter and advocate for removal when appropriate.

4. Identify selection criteria for appropriate indwelling catheter size.

For best outcomes and to limit discomfort with IUC use, the catheter most suitable for the individual should be selected. The nurse must consider the catheter size, catheter tip, balloon size, and material of the catheter (Newman, 2022). Catheter size is the outer circumference of the catheter and is measured using the French (Fr) scale (Newman, 2022). Different sizes are used based on age. According to Newman (2022), a 5-6 Fr catheter is the smallest catheter size and is used for catheterizing premature babies. For newborns and toddlers, a 5-8 Fr catheter is recommended. An 8-10 Fr catheter is used in a school aged child aged 11-12 years old. In adults, a 14 Fr catheter is the standard size unless there is an indication for a different size. A large-size catheter, meaning one that is 16 Fr or larger, can damage the urethral mucosa and bladder neck, cause strictures, and lead to irritation and infection (Newman, 2022). It is only in the cases of hematuria or blood clots that large Fr sizes are utilized draining purposes (Newman, 2022). In addition to diameter, there are varying lengths of catheters. Most catheters are 41-44 cm long but can be specialized to be longer or shorter than this (Newman, 2022). Overall, choosing the correct catheter size prevents harm to the urethra and bladder and reduces the risk of getting a CAUTI (Rubi et al., 2022).

5. Differentiate between a urinary tract infection and colonization.

Accurately diagnosing a CAUTI can be a challenging process. There is a difference between a UTI and colonization of bacteria. For the patient with an indwelling urinary catheter, biofilm begins to develop as early as 15 minutes after catheter insertion and new organisms are acquired in the bladder at a daily rate of 3% to 7% (Newman, 2022). After one month, the patient will have the presence of bacteria in the urine (Newman, 2022). This is termed bacteriuria. More specifically, this is viewed as colonization, or asymptomatic bacteriuria (Newman, 2022). Per the Centers for Disease Control and Prevention (CDC), three criteria must be met for it to be classified as an infection. The first criterion is that the IUC “was in place for more than 2 days on the date of event, with day of device placement being day 1, and an IUC was in place on the date of event or the day before” (Newman, 2022, p. 412). The second criterion is that the patient must display at least one of the following signs or symptoms of a UTI which are fever, suprapubic tenderness, and/or costovertebral angle pain (Newman, 2022). Pyuria and odor are not good indicators of infection because they can be related to other disease processes (Newman, 2022). Of note, certain populations of people will exhibit other CAUTI signs and symptoms. For example, an individual with a spinal cord injury might experience increased spasticity or autonomic dysreflexia (Werneburg, 2022). If the patient is symptomatic, a urine culture is indicated, which demonstrates the third criterion (Newman, 2022). A urine culture containing no more than two species of organisms with growth of a bacterium of more than  $10^5$  CFU/mL can indicate a UTI (Newman, 2022). If all three of these criteria are met, CAUTI treatment can be initiated. This includes removing or changing the urinary catheter and starting antibiotic therapy (Newman, 2022). Given the rising antibiotic resistance rates, the nurse and provider should strive to be both timely and careful in their identification of signs and symptoms, diagnosis, and treatment plan. Unwarranted antibiotic exposure only reinforces the need for CAUTI preventive strategies.

List your references used for this assignment (*See the course syllabus for specific requirements on references for all assignments*).

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