Clostridium difficile infection Article Review

NRS – 433V

Introduction to Nursing Research

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**Introduction**

Upon reading the article, “Infection Prevention and Control in Nursing Homes: A Qualitative Study of Decision-Making Regarding Isolation-Based Practices”, there was a close look at Clostridium Difficle and patients in nursing homes. “Clostridium difficile colitis results from disruption of normal healthy bacteria in the colon, often from antibiotics. C-difficile (C-diff) can also be transmitted from person to person by spores. It can cause severe damage to the colon and even be fatal. As the bacteria overgrow, they release toxins that attack the lining of the intestines. C-diff is highly contangous; EBP proves there is a need to place these patients on isolation precaution” (Mayo, 2016). This ariticle looks at 10 different nursing homes with 73 different interviews (six to eight interviews per facility) lasting appx. 45 minutes long. This study showed that isolation-based practices differed from nursing homes (Cohen, 2015).

**Background of study**

 “C-diff is one of the most common causes of infectious diarrhea in the United States” (Mayo, 2016). There is a difference from nursing homes and how they treat patients with infectuous diseases. “Interviewees discussed practice decisions in the context of organism transmission risk in specific situations and among individual residents. Most nursing home’s isolation practices incorporated the concept of organism ‘containment’, that is, low perceived transmission risk. This was a factor when staff decided the degree to which an infected resident would be limited in social and environmental contact. For example, anything that can be contained, like MRSA (methicillin-resistant Staphylococcus aureus), or VRE (vancomycin-resistant enterococcus) in a wound. Or if a patient has MRSA or VRE in the urine, it is contained within the bag. So, if it’s contained, they can be cohorted” (Cohen, 2015). The purpose is to explore decision-making in isolation based infection prevention and control pracitices in nursing homes. The hypothesis is that isolation precautions are recommended in order to prevent spreading pathogens that are associated with high morbidity; for example, multidrug resistant organisms (MDRO) (Cohen, 2015).

**Methods of study**

This article is a qualitative method of study; “it is used to gain an understanding of underlying reasons, opinions, and motivations. Qualitative research is also used to uncover trends in thought and opinions, and dive deeper into the problem. Some common methods include focus groups (group discussions), individual interviews, and participation/observations” (Wyse, 2011). This method of study was conducted with staff, for example, staff nurses, infection prevention directors as well as directors of nursing “employed in purposefully sampled US nursing homes. Semistructured, role-specific interview guides were developed and interviews were digitally recorded, transcribed verbatim, and analysed using directed content analysis. The research team discussed emerging themes in weekly meetings to confirm consensus”(Cohen, 2015). There has been a research study with 10 different nursing homes and 73 different interviews (six to eight interviews per facility) lasting appx. 45 minutes long. This study included confining an MDRO infected patient within a private room during all activities to prevent organism transmission in order to prevent this organism from being tranmitted to patients that are not affected. Standard precautions guidelines will be used when in contact with infected patients. For example, hand hygiene, use of gowns, gloves and other personal protective equipement depending on the anticipated exposure (Cohen, 2015).

**Results of study**

Within this study there was a variation in the nursing homes practices regarding which patients were isolated, at which point the isolation started, how the isolation was implemented, and these nursing homes setup the isolation for each patient. The patients that were interviewed clearly made decisions dependant upon the healthcare staff preceptions of acceptable transmission risk and patient’s quality of life. Some other influencing factors which influenced decision making was availability of private rooms, and how much time staff devoted to isolation based practices and communication tools. This study revealed a lack of knowledge of key infection prevention and control concepts (Cohen, 2015). Resources are more constrained in nuring homes, which can have an effect on infection prevention and control guidelines within the nursing home setting. There have been some studies that have established that placing a patient in isolation can have negative psychological effects if they are in semiprivate or private isolated rooms. “These adverse effects may be of greater concern in a nursing home facility since it is also a primary residence” (Cohen, 2015). Nursing home facilites have to balance the benefits verses the drawbacks of decreasing the spread of infectious diseases and patients experiencing negative psychological effects of being on isolation. There is a gap in literature when it comes to deciding when and how to implement isolation precautions for patients with infections diseases within the nursing home setting.

**Ethical Considerations**

“Ethical considerations are the principles of respect for persons, beneficence, and justice relevant to the conduct of research” (Grove 503). The privacy of all subjects that participated within this study were protected. There were no identifying factors that would have lead to a Health Insurance Portability and Accountability Act (HIPAA) violation (Grove 99). The only ethical consideration within this study would be the fact that there are some unknown factors, for example, at which point the isolation started, how the isolation was implemented, and these nursing homes setup the isolation for each patient. This study has eithics approval by Columbia University Medical Center Institutional Review Board, University of Pittsburgh Institutional Review Board and RAND Corporation Institutional Review Board.

**Conclusion**

In conclusion, “current clinical guidelines are not specific enough to ensure consistant practice that meets care goals and resource constraints in nursing homes” (Cohen, 2015). Within nursing homes there is a wide variation in how and when isolation based infections preventions and control practices are implemented. It is clear that there is additional training and research that needs to be implemented within the staff providers in nursing homes, with emphesis on isolationbased infection prevention and control practices that are associated with the lowest infection risk among nursing home residents. These research studies would help clinicians’ decision making regarding transmission risk and appropriate practices for individual residents, especially in cases of colonisation, cohorting and other organism containment practices. “New evidence on these topics is required to ensure high-quality, consistent care for this vulnerable population” (Cohen, 2015).

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Peer reviewed research articles

1.- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4805733/>

**2.-** <http://ccn.aacnjournals.org/content/34/4/24.abstract>

### **3**.- <https://www.americanjournalofsurgery.com/article>

**4**.- <http://jlpm.amegroups.com/article/view/>

**5**.- <https://www.hindawi.com/journals/bmri/2018/8414257/>

**6.-** <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6109a3.htm>

1.- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4805733/>

Clostridium difficile (C. difficile) infection (CDI) is the most common cause of ­healthcare-associated infections in US hospitals. The epidemic strain NAP1/BI/ribotype 027 accounts for outbreaks worldwide, with increasing mortality and severity. CDI is acquired from an endogenous source or from spores in the environment, most easily acquired during the hospital stay. The use of antimicrobials disrupts the intestinal microflora enabling C. difficile to proliferate in the colon and produce toxins. Clinical diagnosis in symptomatic patients requires toxin detection from stool specimens and rarely in combination with stool culture to increase sensitivity. However, stool culture is essential for epidemiological studies. Oral metronidazole is the recommended therapy for milder cases of CDI and oral vancomycin or fidaxomicin for more severe cases. Treatment of first recurrence involves the use of the same therapy used in the initial CDI. In the event of a second recurrence oral vancomycin often given in a tapered dose or intermittently, or fidaxomicin may be used. Fecal transplantation is playing an immense role in therapy of recurrent CDI with remarkable results. Fulminant colitis and toxic megacolon warrant surgical intervention. Novel approaches including new antibiotics and immunotherapy against CDI or its toxins appear to be of potential value.

2.- <http://ccn.aacnjournals.org/content/34/4/24.abstract>

Clostridium difficile has become the leading cause of nosocomial diarrhea in adults. A substantial increase has occurred in morbidity and mortality associated with disease caused by C difficile and in the identification of new hypervirulent strains, warranting a high clinical index of suspicion for infections due to this organism. Prevention of infection requires a multidisciplinary approach, including early recognition of disease, effective contact isolation precautions, adherence to disinfectant policies, and judicious use of antibiotics. Current treatment approaches are based on the severity of illness. As hypervirulent strains evolve, unsuccessful treatments are more common. Complicated colitis caused by C difficile may benefit from surgical intervention. Subtotal colectomy and end ileostomy have been the procedures of choice but are associated with a high mortality rate because of late surgical consultation and use of surgery as a salvage therapy. A promising surgical alternative is creation of a diverting loop ileostomy with colonic lavage.

### 3.- <https://www.americanjournalofsurgery.com/article>

### Background

*Clostridium difficile* colitis is an important cause of morbidity and mortality in the surgical patient. In recent years, *Clostridium difficile* infections have shown marked increases in frequency, severity, and resistance to standard treatment. With urgent operative interventions and novel endoscopic approaches, pseudomembranous colitis is being seen more commonly in surgical practices.

Data sources

In this paper, we will review a number of papers from the literature. We will discuss the epidemiology, evaluation and treatment of *Clostridium difficile* infection. Fulminant colitis may require emergency operation. For the surgical endoscopes, fecal microbiota transplantation restores the gastrointestinal flora, and has been shown to be effective in more than 80% of patients.

Conclusion

*Clostridium difficile* infection is a major cause of healthcare-related diarrhea leading to increased morbidity and mortality in surgical patients. Increases in failure rates and resistance to current treatments are clinical and economic challenges in the healthcare situation.

4.- <http://jlpm.amegroups.com/article/view/>

*Clostridium difficile* infection (CDI) is a serious and sometimes life-threatening illness caused by toxin release from *Clostridium difficile* (CD), a gram-positive anaerobic bacterium. Infection with CD can cause clinical manifestations in a spectrum from asymptomatic carrier states to pseudomembranous colitis and toxic megacolon. Accurate diagnosis of CDI depends on early recognition of clinical symptoms of diarrhea, fever, and cramps especially after antibiotic use. Bacterial culture can be performed for epidemiological and antibiogram purposes during outbreaks of CDI. Culture, enzyme immunoassays (EIA), and molecular assays are useful for diagnosis of CDI. Toxigenic culture is useful to determine the cytopathic effect of the bacteria.

Current Infectious Disease Society of America (IDSA) and American College of Gastroenterology (ACG) guidelines recommend using nucleic acid amplification tests or glutamate dehydrogenase (GDH) antigen followed by EIA testing for CD toxin A and B. Future studies for CDI diagnosis are looking toward toxin identification and the use of metabolomic analysis.

**5**.- <https://www.hindawi.com/journals/bmri/2018/8414257/>

Clostridium difficile (C. difficile) is the most prevalent causative pathogen of healthcare-associated diarrhea. Notably, over the past 10 years, the number of Clostridium difficile outbreaks has increased with the rate of morbidity and mortality. The occurrence and spread of C. difficile strains that are resistant to multiple antimicrobial drugs complicate prevention as well as potential treatment options. Most C. difficile isolates are still susceptible to metronidazole and vancomycin. Incidences of C. difficile resistance to other antimicrobial drugs have also been reported. Most of the antibiotics correlated with C. difficile infection (CDI), such as ampicillin, amoxicillin, cephalosporins, clindamycin, and fluoroquinolones, continue to be associated with the highest risk for CDI. Still, the detailed mechanism of resistance to metronidazole or vancomycin is not clear. Alternation in the target sites of the antibiotics is the main mechanism of erythromycin, fluoroquinolone, and rifamycin resistance in C. difficile. In this review, different antimicrobial agents are discussed, and C. difficile resistance patterns and their mechanism of survival are summarized.

**6.-** <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6109a3.htm>

Abstract

**Background:** *Clostridium difficile* infection (CDI) is a common and sometimes fatal health-care–associated infection; the incidence, deaths, and excess health-care costs resulting from CDIs in hospitalized patients are all at historic highs. Meanwhile, the contribution of nonhospital health-care exposures to the overall burden of CDI, and the ability of programs to prevent CDIs by implementing CDC recommendations across a range of hospitals, have not been demonstrated previously.

**Methods:** Population-based data from the Emerging Infections Program were analyzed by location and antecedent health-care exposures. Present-on-admission and hospital-onset, laboratory-identified CDIs reported to the National Healthcare Safety Network (NHSN) were analyzed. Rates of hospital-onset CDIs were compared between two 8-month periods near the beginning and end of three CDI prevention programs that focused primarily on measures to prevent intra-hospital transmission of *C. difficile* in three states (Illinois, Massachusetts, and New York).

**Results:** Among CDIs identified in Emerging Infections Program data in 2010, 94% were associated with receiving health care; of these, 75% had onset among persons not currently hospitalized, including recently discharged patients, outpatients, and nursing home residents. Among CDIs reported to NHSN in 2010, 52% were already present on hospital admission, although they were largely health-care related. The pooled CDI rate declined 20% among 71 hospitals participating in the CDI prevention programs.

**Conclusions:** Nearly all CDIs are related to various health-care settings where predisposing antibiotics are prescribed, and *C. difficile* transmission occurs. Hospital-onset CDIs were prevented through an emphasis on infection control.