

Evidence Based Diagnosis and Prevention of CAUTI

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Quantitative Research Questions and Methods

Part 1: Quantitative Research Question

Research Question: How can the diagnosis and treatment of CAUTIs be optimized through research and evidence-based interventions in hospital settings to prevent complications and recurrence?

Part 2: Quantitative Methods and Data Collection

Catheter-associated urinary tract infections are the most common and secondary nosocomial as well as bloodstream infections acquired by the patients in the healthcare sector that require promising prevention strategies to reduce CAUTI risk. The diagnosis and prevention strategies for CAUTIs risk are controversial and problematic in the unhealthy population with indwelling catheters so novel diagnostic strategies and evidence-based interventions are required to prevent catheter adherence. The research question designed for the quantitative data analysis and collection specifically tries to answer how hospital environments can prevent CAUTI by using the best available evidence and interventions.

The research question implies that CAUTI is a serious problem that affects both patients, and the healthcare system so there is a need for effective and feasible solutions to reduce its incidence and consequences. The research question designed for the present research study addresses and answers several other possible sub-questions including what the risk factors are and causes of CAUTI and the current practices and guidelines for preventing and managing CAUTI in hospital environments. It also addresses promising and innovative interventions for reducing CAUTI, gaps and limitations in the existing literature regarding [CAUTI prevention](#), and management, and how can the interventions be implemented, evaluated, and sustained in different hospital contexts and settings.

Quantitative Data Collection Methods

One possible quantitative research method and data collection tool that the present research study follows is a systemic review of existing studies on CAUTI prevention and reduction. This review provides a comprehensive, systemic, and rigorous synthesis of evidence from multiple library sources

that aim to answer a specific research question which can help the researcher identify the barriers, gaps, best practices, and facilitators in knowledge related to catheter-associated urinary tract infection. For instance, the systemic review through the library sources or collection of databases can be used to compare the effectiveness of different strategies or interventions for CAUTI reduction and prevention such as catheter insertion, catheter removal protocols, catheter maintenance, audit systems, feedback, and infection control measures. This quantitative method of systemic review can also help to assess the strength and quality of the evidence as well as provide recommendations for future research and practice (Meddings et al., 2019).

The quantitative method for data collection also uses a systemic review in accordance with PRISMA guidelines to optimize generalizability to current Medicare and Medicaid settings through multiple library search engines and databases. The database search includes electronic databases such as EMBASE, MEDLINE, and PsycINFO to acknowledge the quality and quantity of peer-reviewed research articles, with titles and abstracts written in the English language, over the period of time. The study includes systemic review articles, quantitative research, and empirical qualitative peer-reviewed literature in order to report gaps, facilitators, and barriers regarding catheter-associated urinary tract infections' related behavior performed by hospital settings including primary care, nursing homes, or community care. Through the RCT data collection tool, research study characteristics such as disease, infection, country, setting, participants, the behavior of the target participants, results of the study, data collection methods and tools, and how the target behavior is measured in the selected research studies.

Another possible data collection method regarding the occurrence of CAUTI in hospital environments is through a Randomized Control Trial (RCT), a quantitative data collection method that is a type of experimental study that compares the outcomes of two or more groups of participants who are randomly assigned to receive different treatments or intervention in hospital environments or out-patient settings. An RCT study method helps the researcher test the effectiveness and safety of a specific intervention or strategy for CAUTI prevention and reduction such as a new educational training program, a new device, or a new protocol. This research method can also help measure the impact of the strategy or intervention on various outcomes such as catheter-associated urinary tract infection's incidence, cost, CAUTI's severity, complications, and above all, patient satisfaction (Gad et al., 2021). Conducting a Randomized Controlled Trial (RCT) to compare the effectiveness of different types of catheters such as antimicrobial-impregnated catheters, silver-alloy coated catheters, or hydrophilic catheters can prevent CAUTI severity in hospital settings.

Quantitative Data Collection Tools

The data collection tool for the quantitative analysis is adapted and used for the characterization of selected studies from multiple databases. The analysis is conducted through various items such as the area of work, title of the study, year of the publication, authors of the study, descriptors used such as language, objectives of the study, design of the study, results or findings of the research,

limitations of the study, recommendations of the study, conclusion, and the level of scientific evidence. The first systemic review is conducted through titles and abstracts of the studies to filter potentially relevant research including meta-analyses, comparative studies, review articles, and clinical trials that are related to CAUTI's spread, reduction, and prevention.

The quantitative data collection tool that follows the Randomized Control Trial (RCT) method reading the occurrence of CAUTI, as well as preventive strategies through evidence-based interventions, is the Consort Statement. This data collection tool helps design, conduct, and report a Randomized Control Trial (RCT) to help ensure that the RCT method for data collection is well-designed, well-executed, and well-reported. This tool is a set of guidelines and a checklist that aims to improve the transparency and quality of RCT as well as facilitate the assessment of reports' applicability and validity. This quantitative data collection tool can be applied to CAUTI trials that evaluate interventions for preventing or creating CAUTI. For instance, the Consort Statement can provide guidance on how to report the complications and adverse events associated with urinary catheters (Atkins et al., 2020). Moreover, the Consort Equivalence and Non-Inferiority extensions can help to report trials that compare the effectiveness of different types of catheters or strategies for the management of catheters. It can also be useful for collecting data related to trials that randomize groups of participants or patients as well as healthcare units.

The quality improvement project of daily targeted rounding for unhealthy individuals with indwelling urinary catheters in a pediatric ICU setting aims to decrease CAUTI risk and increase bundle compliance. This project for data collection through quantitative means uses a multidisciplinary team to assess the appropriateness of catheterization and ensure proper catheter care that helps in eliminating dependent loops in the drainage tubing of the catheter that lead to infections (Werneburg, 2022). Moreover, measuring the cost-benefit and cost-effectiveness of implementing catheter-associated urinary tract infection prevention bundles such as daily catheter care, aseptic insertion technique, and removal of unnecessary catheters in the due time, in different healthcare settings including in-patient and out-patient settings.

References

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