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REAS

LITERATURE REVIEW

Multidisciplinary involvement in the prevention of catheter-associated urinary tract infection: scoping review

Envolvimento multidisciplinar na prevenção de infecção do trato urinário associada à cateter: revisão do escopo

Implicación multidisciplinario en la prevención de la infección urinaria asociada al cateter: revisión del alcance

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Abstract
Objective: Identify scientific evidence about the multidisciplinary team involvement in the prevention of catheter-associated urinary tract infection in adult intensive care unit. **Method**: Scoping review on the databases Embase, Pubmed, Scopus, Cumulative Index to Nursing and Allied Health Literature, and Virtual Health Library. Studies with patients admitted to an adult intensive care unit and in use of urinary catheter, and that assessed multidisciplinary intervention were included. **Results**: Nine studies were included, and most were level II of scientific evidence. Infection reduction was related to bundles implementation, evaluation of catheter insertion and maintenance, daily review of renewal or removal of the catheter, feedback to the intensive care unit health care team, and involvement of hospital managers. **Conclusion**: Strategies involving and that sensitize the health care multidisciplinar team reduce the rate of catheter use and infection in adult intensive care unit.
Descriptors: Intensive Care Units; Urinary Catheterization; Urinary Tract; Patient Care Team.

Resumo
Objetivo: Identificar evidências científicas sobre envolvimento da equipe multiprofissional na prevenção de infecção do trato urinário associada a cateter em unidade de terapia intensiva adulto. **Método:** Revisão de escopo nas bases de dados Embase, Pubmed, Scopus, Cumulative Index to Nursing and Allied Health Literature e Biblioteca Virtual em Saúde. Foram incluídos estudos com pacientes internados em unidade de terapia intensiva adulto em uso de cateter urinário, e que avaliaram intervenção multiprofissional. **Resultados:** Nove estudos foram incluídos, a maioria com nível II de evidência científica. A redução de infecção foi relacionada à implantação de *bundles*, avaliação da inserção/manutenção do cateter, revisão diária da renovação ou remoção do cateter, *feedback* à equipe de saúde e envolvimento dos gestores do hospital. **Conclusão:** Estratégias que envolvam e sensibilizem a equipe multiprofissional de saúde reduzem o índice de uso de cateter e infecção em unidade de terapia intensiva adulto.
Descritores: Unidades de Terapia Intensiva; Cateterismo Urinário; Sistema Urinário; Equipe de assistência ao paciente.

Resumen
Objetivo: Identificar evidencia científica sobre la participación de la equipo multidisciplinario en la prevención de la infección urinaria asociada a catéter en una unidad de cuidados intensivos de adultos. **Método:** Revisión del alcance en bases de datos Embase, Pubmed, Scopus, Cumulative Index to Nursing and Allied Health Literature y Biblioteca Virtual de Salud. Se incluyeron estudios con pacientes adultos en unidad de cuidados intensivos con sonda urinaria, que evaluó la intervención con equipo multidisciplinario. **Resultados:** Se incluyeron nueve estudios, la mayoría con evidencia científica de nivel II. La reducción de infección se relacionó con la implementación de paquetes, la evaluación de la inserción y el mantenimiento del catéter, la revisión diaria de la renovación o extracción del catéter, la retroalimentación al equipo de salud de la unidad de cuidados intensivos y la participación de los administradores del hospital. **Conclusión:** Las estrategias que involucran y sensibilizan al equipo de salud multidisciplinario reducen la tasa de uso de catéteres y infección en unidad de cuidados intensivos de adultos.
Descriptores: Unidades de Cuidados Intensivos; Cateterismo Urinario; Sistema Urinario; Grupo de Atención al Paciente.

INTRODUCTION

Urinary tract infection (UTI) is one of the major health care associated infections (HAI), generally, associated with urinary catheter.[1] In the United States, about 1.7 million cases of HAI are reported annually, which 12.9% are UTI and 23% occur in intensive care unit (ICU).[2] UTI affects 35% to 45% of adult patients with an incidence of 3.1-7.4/1000 catheters-day, and 16-25% of patients are be submitted to urinary catheterization, usually without necessary evaluation of the health care multidisciplinary team.[1]

Long-term urinary catheter favors local and systemic complications, patient discomfort associated with trauma, mobility restriction, and catheter-associated urinary tract infections (CAUTI).[3] CAUTI is any urinary tract infection in symptomatic patients undergoing urinary catheter use for, at least, 48 hours.[1] The Society of Infectious Diseases of America (IDSA)[4] defines this infection by the following criteria: 1) urinary catheter delay for more than two days after insertion; 2) a sign or symptom, including fever, suprapubic sensitivity, costovertebral angle sensitivity, frequency or urgency or urinary dysuria; and 3) urine culture with more than 10^5 colony forming units/mL.

CAUTI prevention includes catheter insertion and handling measures, establishment of clear criteria for the indication and duration of the urethral catheterization. The involvement of health care multidisciplinary team in the implementation of strategies, protocols, and bundles for prevention and control of CAUTI is crucial for reaching success and promoting the culture of safety.[1,5]Therefore, the objective of this study was to identify and map scientific evidence about preventive strategies for CAUTI that involved the heath care multidisciplinar team in intensive care unit.

METHODS

This Scoping Review was developed according to the method proposed by the Joanna Briggs Institute (JBI)[6], in five stages: I. identification of the research question; II. identification of relevant studies; III. selection of studies; IV. data analysis; V. data synthesis and presentation.[7]The PCC (P: Population, C: Concept and C: Context) strategy was used for elaborating the guiding question: What are the strategies for prevention and control of CAUTI that involve the health care team, in the context of the adult intensive care unit?

Two independently reviewers searched the databases: Embase™, National Library of Medicine (Pubmed), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Scopus and Virtual Health Library. The following search terms were

applied (separately and associated): intensive care units, urinary catheterization, catheter-related infections, and patient care teams; and urinary tract infection. This review included original articles, published in English, Spanish, or Portuguese, from January 2009 to November 2020, and that involved interventions that included the involvement of the health care team in the prevention and control of CAUTI. Studies were excluded if addressed intermittent urinary catheterization, prophylactic use of antibiotics for the prevention of CAUTI, theses, dissertations, review articles, and articles without abstract. Also, the bibliographic references of the studies that reached the inclusion criteria were reviewed to find potentially eligible articles.

The data were collected using a checklist that included: general characteristics of the article (authors; year of publication, the country where the research was conducted; and type of method); strategies/interventions; main results; and study evidence, according to the Oxford Centre for Evidence-Based Medicine classification.[8]

RESULTS

From the 865 studies found, nine reached this review inclusion criteria (Figure 1).

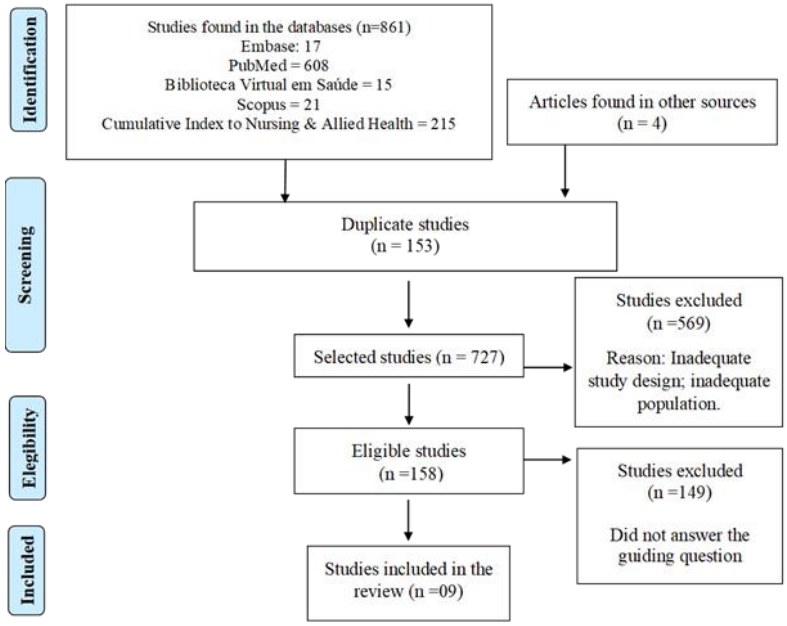

Figure 1 - Flowchart of the studies identification, screening, elegibility and inclusion in scoping review.[9]
Source: The PRISMA Group, 2009, adapted.

Most of the studies were classified as scientific evidence level II (n=8). The majority of the studies showed a reduction in CAUTI after the implementation of interventions involving the health care team (n = 8 - 88.9%), as well as reduction in the number of catheters utilization (n = 4 - 44.5%) and in number of isolated microorganisms (n = 1 - 11.2%). One study found no difference before and after the interventions. The multidisciplinary interventions resulted in a greater adherence by the health care team to preventive measures for CAUTI (n = 2 - 22.3%) (Chart 1).

Chart 1- Measures to avoid cateter-associated urinary tract infection (CAUTI) in adult intensive care (ICU), involving the health care team.

Author, year (Country) Evidence level	Study design	Characteristics of the ICU	Strategy/Intervention	Main results
Meddings et al., 2020[10] (United States and Puerto Rico) Level of evidence: IIB	Coorte	280 of the 366 adult ICUs recruited from 220 hospitals in 16	- Video-on-demand modules and live webinars presented, - Revision of a two-step approach to implement the main technical and socio-adaptive factors to prevent catheter infections, using patient safety principle programs.	- There were no statistically applied reductions in the adjusted CAUTI rates (CAUTI TIR = 0,79, 95% CI 0.59 to 1.06, P = 0.12), and the adjusted use of the urinary catheter were not changed (TIR = 0.98 to 1.01, P = 0.14).
Menegueti et al., 2019[11] (Brazil) Level of evidence: IIB	Quasi-experimental	9-bed general ICU of a public hospital	Implementation of the protocol in 4 phases: - I, the clinical team was reminded of preventive measures (2005-2006); - II, called biannual training (2007-2010), it consisted of training the entire clinical team every 6 months. The training was based on the Centers for Disease Control and Prevention (CDC)'s CAUTI prevention guide; - III, named checklist plus biannual training (2011-2014), the biannual training sessions continued and a daily checklist to assess the indication and/or maintenance of any internal urinary catheter was added; - IV, checklist and initial training (2015–2016), biannual training of all personnel was replaced by mandatory training for newly hired personnel, daily checklist was maintained.	- Average rate of urinary catheter use decreased from phase I to phase IV (73.1%, 74.1%, 54.9%, and 45.6%, respectively). - CAUTI incidence density decreased from phase I to phase IV (14.9, 7.3, 3.8, and 1.1 per 1,000 catheter-days, respectively).
Al-Hameed et al 2018[12] (Saudi Arabia) Level of evidence:	Observational study	28-beds adult ICU	- Review of clinical practice guidelines based on evidence (Society for Healthcare Epidemiology of America - SHEA, Infectious Diseases Society of America - IDSA, and CDC) by the multidisciplinary team; - Discussion with department leaders	Compliance rate for CAUTI preventive measures increased. - Daily reminders for the nurse

IIB			to understand the problem and its preventive nature, establishing a patient safety culture. - Multidisciplinary team responsible for continuing education, and for monitoring the goals established for the implementation of the guidelines. - Screening patients at admission to identify urinary catheter indications. Daily review of the need for renewal or removal of the catheter. - Nursing staff trained to monitor adherence to catheter insertion/maintenance bundles. - During the discussion of bedside cases, physicians were reminded to document the removal or renewal of the catheter. - Hospital infection control service was responsible for monitoring hand hygiene. - ICU nursing manager as responsible for strictly monitoring and documenting catheter renewal, removal, insertion, and daily maintenance. - Disclosure of data monthly and quarterly to ICU professionals.	manager were relevant to reduced rates of the CAUTI. - At the end of the study period, the rates of CAUTI were reduced to 0.3/1000 catheters-day, and compliance to institutionalized CAUTI preventive measures was 98%.
Gupta et al. 2017[13] (United States) Level of evidence: IIB	Retrospective study	20-bed medical ICU	- Interventions carried out monthly with professionals from the ICU with participation of hospital infection control service team. - Disclosure of CAUTI rates, through posters in the ICU, showing the downward trend and the publication of catheter use rate to provide positive reinforcement for the team. - Professionals involvement and commitment to reduce the days of a urinary catheter, to keep the utilization rate below the national rate, and decrease the CAUTI rate. - Physicians were instructed to prescribe urinary catheter only for patients who fit into the pre-established criteria: patients with chronic urinary retention, patients with neurogenic bladder dysfunction, to improve the comfort of care at the end of life, if necessary, patients planned for urological procedures, trauma patients or bladder surgery, among others. - Nurse autonomy for managing	- The rate urinary catheter use decreased from 0.92 to 0.28 (after 3 interventions: permit urinary catheter use only in predetermined indications; narrow down the criteria for urinary catheter utilization to urinary retention and genitourinary procedures only; and use sonographic bladder scanning to identify high-risk patients who may need indwelling catheters) (P <

			catheter removal, when necessary. - Screening of patients upon admission by the multidisciplinary team. - Identification of potential barriers related to the implementation of the protocol according to the team's perception.	0.0001). - The rates of CAUTI decrease from 5.47 to 1.08 (after 3 interventions) (P = 0.0134).
Miranda et al. 2016[14] (Brazil) Level of evidence: IIA	Quasi-experimental study (before and after)	15-bed adult ICU of a high complexity hospital	- Implementation of a protocol according to the recommendations of the Ministry of Health for the prevention of CAUTI: urinary infection insertion in aseptic technique; daily review of the need to maintain the catheter and remove it as soon as possible; avoiding the unnecessary use of urinary catheters; maintenance of catheter based on protocols established in the ICU. - Continued education of the multidisciplinary team on compliance to the protocol. - Catheter insertion and maintenance procedures according to a checklist prepared by the health service, following the recommendations of the Ministry of Health. - Urinary catheter compliance protocol was filled out daily by hospital infection control service team, and non-compliance notified.	- Reduction of notification of cases of CAUTI (P = 0.045) - There was no difference in the rate of catheter use before and after the implementation of the protocol. - The implementation of the protocol reduced the number of microorganisms found in urine cultures (P = 0.026).
Regagnin et al.2016[15] (Brazil) Level of evidence: IIIB	Quasi-experimental study	48-bed medical-surgical ICU and step-down units with 95 beds in a private tertiary hospital	- Phase 1: ICU Nurses and physicians (mainly urologists) performed the insertion of urinary catheters; the decision to remove the urinary catheter was made solely by the patient's physicians; audit of the insertion procedure of the urinary catheter. - Phase 2: Catheter insertion process was audited monthly. The following bundles were included: hand hygiene, skin preparation with chlorhexidine and antisepsis of the urethral meatus, sterile field, and gloves, only one insertion attempt allowed for each catheter, adequate insufflation, and daily review of the need for removal. - Phase 3: Nurse designated exclusively for preventing CAUTI; intensification of audits; specific team for insertion of urinary catheter; and monthly feedback on	- After the three phases of the study, CAUTI rates in the ICUs reduced from 7.0 to 0.9 infections per 1,000 catheter-days.

			CAUTI rates.	
Tominaga et al., 2014[16] (United States) Level of evidence: IIB	Retrospective study	Medical, cardiac, or surgical ICUs	- Auditing of urinary cateter (UC) care weekly with quarterly reporting of infection data - Urinary catheter insertion and maintenance (UCIM) form - Removal of prepackaged baths and pericare wipes - Housewide education on proper UC insertion and care - Second person observation of every UC insertion - Daily auditing of UCIM; Monthly reporting of CAUTI data; twice daily UC care - UC drainage bag emptied at 400 mL or once per 12 hours - Foley trial; - CAUTI feedback given to physicians instituted - Prepackaged pericare and wipes implemented; bath tub basins eliminated; once daily UC care instituted - Lead clinical nurse specialist on leave of absence Lead clinical nurse specialist back full time	- Catheter-days (CD) and cateter utilization rate (DUR) decreased (fiscal year 2008: CD, 11,414; DUR, .85 vs fiscal year 2013:CD, 8,144; DUR, .70). - Infection ratio (IR) increased with suspension of prepackaged baths (IR 3.2 to 3.5 to 4.9 to 5.0), twice daily urinary cateter (UC) care (IR 4.8 to 6.7), emptying UC bags at 400 mL (IR 6.7 to 9.2), and two-person UC placement (IR 5.6 to 4.8), physician notification of CAUTI (IR 6.1 to 4.8), and reinstitution of prepackaged baths and daily UC care (IR 4.8 to 3.7) decreased CAUTI rates.
Arora et al., 2014[17] (United States) Level of evidence: IIB	Quasi-experimental study	17-bed medical/surgical ICU	- Indications and duration of urinary catheter, infection signs and symptoms, and indication for continuous use discussed for each patient by the multidisciplinary team in the ICU. - Urinary catheters removed immediately if indication was no longer justified or in case of infection sign.	- Cases discussion by a multidisciplinary team significantly decreased the number of days of urinary catheterization (5304 to 4541 days) and CAUTI rate (4.71 to 1.98 infections / 1000 days in the

				ICU).
Kanj et al., 2013[18] (Lebanon) Level of evidence: IIB	Prospective study	Medical–surgical adult ICU	- Multidimensional infection control approach based on the recommendations of SHEA and IDSA: implementation of bundles, educational training, results monitoring, surveillance and disclosure of CAUTI rates, and feedback of CAUTI control practices performance to the multidisciplinary team.	- 83% reduction in the CAUTI rate (13.07 to 2.21 per 1000 catheter-days); - Progressive reduction in the incidence of CAUTI (72%); - Increased adherence to hand hygiene, and 100% adherence in relation to the correct positioning of the urinary catheter, and care with the collection bag.

The main interventions involving the health care team in order to reduce CAUTI in adult ICUs included: implementation of preventive measures (by reviewing clinical practice guidelines based on evidence or bundles) (n=7 – 77,8%); education and training with the ICU health care team (n=6 – 66,7%); feedback of CAUTI and control practices performance to the multidisciplinary team (n=05 – 55,6%); implementation of checklist/form for indication and/or insertion and/or maintenance of the catheter (n=03 – 33,4%); discussion with department leaders and multidisciplinay team (n=02 – 22,3%); screening of patient upon admission (n=2 - 22,3%); involvement of the hospital infection control service members (n=02 - 22,3%); auditing of urinary cateter insertion procedure and care (n=2 - 22,3%); nurse autonomy for managing catheter removal (n=1 – 11,2%); nurse designated exclusively for preventing CAUTI (n=1 - 11,2%); identification of potential barriers related to the implementation of the protocol (n=1 - 11,2%); urinary catheter compliance protocol (n=1 - 11,2%) (Chart 1).

DISCUSSION

Urinary catheter insertion is a necessary and important procedure for the treatment of the patient in ICU, which makes it essential to understand potential measures to reduce the risk of CAUTI. The multidisciplinary team interventions in ICU showed to be a strategy that favors the reduction of CAUTI rates[14], also limiting the use of urinary catheters[13,15,18,19], which is

essential to decrease the incidence of CAUTI. Therefore, contributing to the adherence to the best practices for insertion and maintenance of the urinary catheter by professionals[12,18], and improving the quality of health care.

For the success of CAUTI preventive strategies involving the health care multidisciplinary team, such as bundles (package of preventive measures based on scientific evidence) and urinary catheter indication/insertion/maintenance checklist, the team' education/training programs on a regular basis is of ulmost importance.[10,12,16] Training contributes to the development of skills and process standard, however it must be inserted in the work routine in a dynamic way and focused awareness of the health care professionals.[10, 11, 14]

Another fundamental factor for achieving the goal of reducing CAUTI is the inclusion of department leaders and members of the hospital infection control service in the team.[14,19] Involvement of hospital leadership and administration resulted in considerable outcome regarding reduction of CAUTI in adult ICU, from 2.3 to 0.3 per 1000 catheter-day.[12]

As the leaders of the major health care workers team, nurses play a key role in infection control.[11,13, 16] Nurses' autonomy and leadership, including their empowerment to remove urinary catheter, is essential to the management and decrease of CAUTI.[13,19] An example of nursing leadership as essential for infection control was reported in a tertiary community hospital in USA, where an increase in combating CAUTI rate happened when the lead nurse specialist was on leave of absence, and decreased upon her return.[16] Experience and education was shown to have impact on the level of nurses' knowledge about CAUTI, therefore, education and training to support nurses' knowledge is necessary to improve CAUTI prevention. However, it is worthy highlighting that the whole health care team members must be aware of the value and significance of nurse-driven protocols to remove indwelling urinary catheters for reducing CAUTIs.[20]

Disclosure of CAUTI rates and performance feedback reveal the effectiveness of interventions implemented and allow comparations and dissemination of information.[12,13,15] These measures result in better behavior of professionals[18], provide positive re-enforcement[13] and may serve to guide health care workers for improving patient safety, by creating a safer environment for patients.[20] Thus, these strategies aid identifying potential barriers related to the implementation of CAUTI preventive measures by the multidisciplinary team, and also the team's commitment to keep CAUTI rates reduced.[13]

CONCLUSION

Strategies involving and that sensitize the health care multidisciplinar team reduce the rate of catheter use and CAUTI in adult ICU. The way that CAUTI prevention measures were implemented, from the perspective of professionals, provides tools that can be applied in practice, based on results to qualify care, to minimize the risk of adverse events in the prevention and control of CAUTI.

Among the limitations of this study, we highlight the language barrier, as only publications in English, Portuguese, and Spanish were included. Furthermore, the analysis was restricted to articles available in full text, which may have reduced the scope of the information. Another limitation pertains to the databases used, which possibly constrained the review's reach and, consequently, the breadth of the results obtained. Additionally, the scarcity of previous research on the topic posed a significant challenge. These factors underscore the need for future studies that expand the inclusion of languages, explore different databases, and contribute to the deepening and diversification of knowledge on the subject.

REFERENCES

1. Agência Nacional de Vigilância Sanitária. Critérios diagnósticos de infecções relacionadas à assistência à saúde [Internet]. Brasília, DF: Anvisa, 2017 [cited 2019 Apr 16]. Available from: https://www.gov.br/anvisa/pt-br/centraisdeconteudo/publicacoes/servicosdesaude/publicacoes/caderno-2-criterios-diagnosticos-de-infeccao-relacionada-a-assistencia-a-saude.pdf

2. Chenoweth C, Saint S. Preventing catheter-associated urinary tract infections in the intensive care unit. Crit Care Clin. [Internet]. 2013 [cited 2025 Jan 16]; 29(1):19-32. Available from: https://www.sciencedirect.com/science/article/pii/S0749070412000826?via%3Dihub

3. Lopes KR, Jorge BM, Barbosa MH, Barichello E, Nicolussi AC. Uso de la ultrasonografía en la evaluación de la retención urinaria en pacientes críticos. Rev Latinoam Enferm. [Internet]. 2023 [cited 2025 Jan 16]; 31:e4025. Available from: https://www.scielo.br/j/rlae/a/HRpCjtrwSC5FYDz3D6RMVJK/?format=pdf&lang=en

4. Hooton TM, Bradley SF, Cardenas DD, Colgan R, Geerlings SE, Rice JC, et al. Diagnosis, prevention, and treatment of catheter-associated urinary tract infection in adults: 2009 International Clinical Practice Guidelines from the Infectious Diseases Society of America. Clin Infect Dis. [Internet]. 2010 [cited 2025 Jan 16]; 50(5):625-63. Available from: https://academic.oup.com/cid/article-pdf/50/5/625/34128221/50-5-625.pdf

5. Parida S, Mishra SK. Urinary tract infections in the critical care unit: a brief review. Indian J Crit Care Med. [Internet]. 2013 [cited 2025 Jan 16]; 17(6):370-4. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC3902573/pdf/IJCCM-17-370.pdf

6. The Joanna Briggs Institute. The Joanna Briggs Institute Reviewers' Manual 2015: methodology for JBI scoping reviews [Internet]. Adelaide, AU: JBI; 2015 [cited

2025 Jan 16]. 24 p. Available from: https://reben.com.br/revista/wp-content/uploads/2020/10/Scoping.pdf
7. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. Int J Soc Res Methodol. [Internet]. 2005 [cited 2025 Jan 16]; 8(1):19-32. Available from: https://www.tandfonline.com/doi/epdf/10.1080/1364557032000119616?needAccess=true
8. Phillips B, Ball C, Sackett D, Badenoch D, Straus S, Haynes B, et al. Centre for evidence-based medicine. Oxford, UK: Centre for Evidence-Based Medicine (University of Oxford); 2025. Available from: www.cebm.ox.ac.uk
9. Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group. Preferred reporting items for systematic reviews and metaanalyses: the PRISMA statement (Chinese edition). Journal of Chinese Integrative Medicine [Internet]. 2009 [cited 2025 Jan 16]; 7(9):889-96. Available from: http://www.jcimjournal.com/EN/10.3736/jcim20090918#1
10. Meddings J, Greene MT, Ratz D, Ameling J, Fowler KE, Rolle AJ, et al. Multistate programme to reduce catheter-associated infections in intensive care units with elevated infection rates. BMJ Qual Saf. [Internet]. 2020 [cited 2025 Jan 16]; 29(5):418-429. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC7176547/pdf/bmjqs-2019-009330.pdf
11. Menegueti MG, Ciol MA, Bellissimo-Rodrigues F, Auxiliadora-Martins M, Gaspar GG, Canini SRMS, et al. Long-term prevention of catheter-associated urinary tract infections among critically ill patients through the implementation of an educational program and a daily checklist for maintenance of indwelling urinary catheters. Medicine (Baltimore) [Internet]. 2019 [cited 2025 Jan 16]; 98(8):e14417. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC6407993/pdf/medi-98-e14417.pdf
12. Al-Hameed FM, Ahmed GR, AlSaedi AA, Bhutta MJ, Al-Hameed FF, AlShamrani MM. Applying preventive measures leading to significant reduction of cateter-associated urinary tract infections in adult intensive care unit. Saudi Med J. [Internet]. 2018 [cited 2025 Jan 16]; 39(1):97-102. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC5885128/pdf/SaudiMedJ-39-97.pdf
13. Gupta SS, Irukulla PK, Shenoy MA, Nyemba V, Yacoub D, Kupfer Y. Successful strategy to decrease indwelling cateter utilization rates in an academic medical intensive care unit. Am J Infect Control. [Internet]. 2017 [cited 2025 Jan 16]; 45(12):1349-55. Available from: https://www.sciencedirect.com/science/article/pii/S0196655317308386?via%3Dihub
14. Miranda AL, Oliveira ALLD, Nacer DT, Aguiar CAM. Results after implementation of a protocol on the incidence of urinary tract infection in an intensive care unit. Rev Latinoam Enferm. [Internet]. 2016 [cited 2025 Jan 16]; 24:e2804. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC5048729/pdf/0104-1169-rlae-24-02804.pdf
15. Regagnin DA, Alves DSS, Cavalheiro AM, Camargo TZS, Marra AR, Victor ESV, et al. Sustainability of a program for continuous reduction of catheter-associated urinary tract infection. Am J Infect Control. [Internet]. 2016 [cited 2025 Jan 16]; 44(6):642-6. Available from: https://www.sciencedirect.com/science/article/pii/S0196655315012390?via%3Dihub
16. Tominaga GT, Dhupa A, McAllister SM, Calara R, Peters SA, Stuck A. Eliminating catheter-associated urinary tract infections in the intensive care unit: is it an attainable goal? Am J Surg. [Internet]. 2014 [cited 2025 Jan 16]; 208(6):1065-70. Available from: https://www.sciencedirect.com/science/article/pii/S0002961014004462?via%3Dihub
17. Arora N, Patel K, Engell CA, LaRosa JA. The Effect of interdisciplinary team rounds on urinary catheter and central venous catheter days and rates of infection. Am J Med Qual. [Internet]. 2014 [cited 2025 Jan 16]; 29(4):329-34. Available from: https://journals.sagepub.com/doi/reader/10.1177/1062860613500519

18. Kanj SS, Zahreddine N, Rosenthal VD, Alamuddin L, Kanafani Z, Molaeb B. Impact of a multidimensional infection control approach on catheter-associated urinary tract infection rates in an adult intensive care unit in Lebanon: International Nosocomial Infection Control Consortium (INICC) findings. Int J Infect Dis. [Internet]. 2013 [cited 2025 Jan 16]; 17(9):e686-90. Available from: https://www.sciencedirect.com/science/article/pii/S1201971213000714?via%3Dihub
19. Dbeibo L, Yeap YL, Porter H, Beeson T, Schmidt CM, House MG, et al. Real world utilization of nurse-driven urinary catheter removal protocol in patients with epidural pain catheters. Am J Infect Control. [Internet]. 2021 [cited 2025 Jan 16]; 50(4):396-9. Available from: https://www.sciencedirect.com/science/article/pii/S019665532100612X?via%3Dihub
20. Mong I, Ramoo V, Ponnampalavanar S, Chong MC, Wan Nawawi WNF. Knowledge, attitude and practice in relation to catheter-associated urinary tract infection (CAUTI) prevention: a cross-sectional study. J Clin Nurs. [Internet]. 2021 [cited 2025 Jan 16]; 31(1-2):209-219. Available from: https://onlinelibrary.wiley.com/doi/epdf/10.1111/jocn.15899

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