



Nursing Interventions to Reduce Hospital-Acquired Infections in Intensive

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Abstract

Background: HAIs remain a great threat to patients in ICUs, and thus require potent measures backed up by stringent policies.

Aim: Whilst this will discover the prevalence of HAIs in ICUs, associated risks, risky nursing activities, and policies which may exist for scrutiny.

Methods: A literature search was therefore performed specifically for the occurrence of infection prevention and control policy in the context of ICU.

Results: Such HAIs as CLABSIs, VAP, and CAUTIs are widespread because of invasive interventions and improper care for patients' cleanliness. Interventions based on research, staff training and definitive funding policies directly affect infection prevention.

Conclusion: Integrating nursing practices alongside effective policies decreases HAIs, improves patient outcomes and solves antimicrobial resistance issues.

Keywords: Acquired conveniences, critical care units, infection control, nursing, politics.

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Introduction

HAIs present a major threat to patients and most often to patients in ICUs because such patients suffer from severe diseases and complications, and undergo invasive procedures. The rate of these infections such as CLABSI, CAUTI, OR VAP researching the importance of effective infection prevention strategies. However, the kind of clinical intervention is an instrument to solve these problems, the basis for efficient infection control is multiple policies regulating activities in the sphere of healthcare, staff and resources distribution and accountability. By harnessing the skills of politicians, public health officials and medical practitioners, policy making at institutional, national and global levels could go far toward improving and sustaining low infection rates, enhancing patient outcomes and meeting current and future challenges, such as Antimicrobial Resistance. This paper aims to establish the prevalence of HAIs in the ICUs, establish the causes, and discuss evidence-based approaches to nursing, as well as stressing on policy implications that will improve the prevention of HAIs.[1]

Hospital-Acquired Infections: Scope and Impact in ICUs

HAIs or Nosocomial infections have emerged as a major concern in healthcare organization and particularly in ICUs globally. These infections are acquired within the healthcare setting – they develop two days or more after admission to a healthcare facility but were not present or were not infectious at the time of admission. Being closed and specialized units for treatment of patients who are in a severe state, ICUs provide conditions favorable for HAIs to develop because patient population is often on mechanical ventilation, or has a line inserted, they stay longer in the hospital, and their immune responses are compromised. To the best of our knowledge, the four most frequent HAIs in the ICU are VAP, CLABSIs, CAUTIs, and SSIs. These infections contribute morbidity and mortality in patient admitted to the ICU, that is why prevention and control of these infections is important in managing these patients.[2] HAIs in ICUs have a deep effect on patient's health as well as healthcare organizations in general. To patients, HAIs may prolong a stay in the hospital, worsen pre-existing illnesses or increase the risk of dying. More so, these patients in the ICUs are immunocompromised, that is, they can get infected rather easily by pathogens that may not necessarily cause severe disease in normally healthy people. HAIs leads to pain and discomfort, loss of quality life, dependence on further medical intervention and support. HAIs also have a big implication on financial security because treatment costs more when it involves extra diagnostic tests, longer use of antibiotics and longer days in hospital thus creating more pressure on hospital resources. However, HAIs can also lead to lowered hospital productivity and can harm the hospital's image because patients may be dissatisfied with their stay, as well as receive a negative clinical outcome.[3] New generations of antibiotic-resistant pathogens including methicillin-resistant *Staphylococcus aureus* (MRSA) and carbapenem-resistant Enterobacteriaceae (CRE) have been added to the existing list of HAIs aggravated by antibiotic misuse. As these are MDRAs they pose major challenges to management protocols and underscore the need for effective infection prevention measures in ICU settings. Preventing HAIs depends on the availability of common infection control precautions, strict adherence with those measures, staff education, and research-based nursing practices. Some of the benefits of decreasing HAIs in healthcare organizations include; patients' better health status, saving on expenses, and general health system quality enhancement.[4]

Main Risk Factors for Infections in Intensive Care Units

It is critical care facilities that are wards or sections of the hospital where beneficiaries commonly suffer from life-threatening conditions. However, the type of care delivered in the setting of ICUs makes the patients more prone to getting HAIs. The situation is peculiar to the ICUs due to the patient's weakness, the elevated usage of invasive procedures, and numerous health care-associated factors. This paper aims to identify the main risk factors of HAIs in these contexts in order to formulate preventive measures.[5] The key source of PPE relates to the use of medical devices including central venous catheters, urinary catheters,

and mechanical ventilators. These devices are quite helpful to the ICU patients, although they eliminate natural barriers to infections and offer the pathogens a direct route into the patient. For instance, central venous catheters also cause bloodstream infections; mechanical ventilators also increase the risk of acquiring VAP. This is even worse given that the consistent use of these devices contributes to raging, which only makes taking out the devices on time as well as cleaning them crucial.[6] Another factor is the severity of the client and the constantly critical state of ICU patients. A large number of ICU patients are immunocompromised due to their chronic diseases, surgeries, or therapies including chemotherapy and immunosuppressive medicines. Microbial organisms which do not normally cause diseases in healthy individuals are able to affect individuals with a weakened immune system due to their ability to become sick more easily. Further, if the patient is malnourished, of advanced age or has other diseases like diabetes or chronic diseases of the respiratory system, all of this also contributes to aggravating the risk of HAIs.[7] Another factor related to infections occurring in the ICU includes internal environment factors. For instance, high patient – nurse ratio, overcrowding, and poor compliance with infection control measures promote pathways’ dissemination. This simply implies that almost anything that surrounds healthcare personnel and patients can act as a source of bacterial, fungal, or viral growth if contaminated with pathogenic microorganisms and not well-disinfected. Another example is Difficult together with MDR organisms like MRSA, VAPs and CRE are especially problematic in the ICU because they are highly resilient in the environment and can barely be treated.[8] Last but not the least; the broad and abrupt prescription of drugs, especially, antibiotics in the ICU fosters the emergence of antimicrobial resistance. Although, bacteria are essential for treating infection they can be used irresponsibly leading to alteration of the normal flora and rise in antibiotic-resistant organisms. This also makes infections harder to manage and above this, comes the increased risk of being compounded by further complications or death.[9] These risk factors entities need to be solved by means of the team cooperated approach, relevant infection control measures, carrying out a staff training, the antibiotics’ reasonable usage, and the ICU practices’ constant monitoring. Managing these potentials risks enable the health care teams decrease the HAIs and enhance the patients’ results in the ICUs. [10]

Evidence-Based Nursing Practices to Prevent Infections

Evaluating effectiveness of intervention implementing to reduce hospital-acquired infections (HAIs) in intensive care unit (ICUs) envision as a paramount aspect of nursing practice. They are evidence informed and evidence based that makes them effective and feasible practice in managing infections. Nurses are the main actors since they see the patients directly and can ensure good results due to compliance with the rules of infection control.[11] Proper hand washing is among the many fundamental research based measures that ought to be in practice. The findings also revealed that hand hygiene remains the single most effective means of breaking the chain of pathogen transmission across healthcare facilities. To minimize the risks of transmitting pathogens patients and nurses are required to wear gloves and masks and hand washing with alcohol-based hand rubs or with water and soap before and after encountering the patients, touching any surfaces that could be contaminated and before performing any surgical or sterile procedures. Several research works confirmed that increasing hand hygiene practice results in a reduced prevalence of HAIs such as, the blood borne infections and VAP.[12] Another critical practice is the maintenance that deserves invasive medical devices that have been implanted on the patients’ bodies. CLABSIs, CAUTIs and VAP are the most rampant HAIs in ICUs with high impact rates in deaths and healthcare costs. To avoid these, nurses should be conversant with some of the principles of evidence such as use of aseptic measures when placing these devices, frequency at which nurses assess the need for these devices, and removal of the devices when not necessary. For example, Ventilator Care Bundle which comprises tasks such as turning the patient’s head to the side and ensuring the head of the bed is elevated, daily teardown of sedation, chlorhexidine oral care, and subglottic suction can be used to drastically and role of VAP in Healthcare-Associated Pneumonia reduce VAP by over 50 percent. [13] Environmental measure is another essential component of the infection controls. Temporary ICU staff, surfaces exposed to ICU, and various endoscopy instruments as well as other shared devices will also become sources of pathogens. Care givers need to make sure these surfaces and medical devices are cleaned and disinfected in a proper way. For instance,

applying single-use equipment or the specific equipment for different patients reduce cross contamination. Also, it is important for nurses to requesting and taking part in the normal infection surveillance exams so as to prevent different ailments from spreading.[14]Infections prevention and control practice also contributes to this fight given that, antimicrobials resistance is a major concern in healthcare. Nurses are effective stakeholders in these endeavors guaranteeing that suitable antibiotics are given appropriately while charging patients and their families the significance of using the full course. These facts show that avoiding antibiotic misuse lowers the propensity of getting a resistant infection and maintains currently available treatment effectiveness.[15]Last but not the least, regular updated and training to nursing staff is very important for ensuring standard infection prevention. The implementation plan of the new practices entails holding frequent skills, drill, and practice sessions; use of simulations; and acquisition of new evidence findings. Furthermore, the to establish cultures of safety and known creating an accountability amongst the healthcare team ensures compliance to standards, checklist and improvement of communication with regards to any perceived loophole or problem to infection control.[16]In this way, using these evidenced based practices and implementing them conservatively are able to reduce HAIs in ICUs and contribute to better results in the patients' stay therefore the quality of care offered is boosted. The efforts being made are not only good for saving lives, but also addresses the issue of affordability of health care and health systems credibility. [18]

Implementing Hand Hygiene and Infection Control Protocols

Hand hygiene is recognized as one of the most important measures of infection prevention and control anywhere, including ICUs. Hand hygiene ensures that pathogens are not transmitted from the hand of the healthcare worker, patients or in the environment that is shown to have reduced hospital-acquired infections (HAIs). Hand hygiene interventions are complex in nature and answerable to a comprehensive, multi-sectorial educational, surveillance, and organizational plan.[19] The first key process within hand hygiene safety measures involves dh to all the staff in the healthcare setting including, nurses, physicians, auxiliary and other support staff to appreciate the need for hand hygiene and how to go about it correctly by either washing hands or using hand sanitizers. A number of well-reputed and scientifically proven sources for management, treatment and prevention of infections including WHO and CDC suggest the convenience of alcohol-based hand rubbing to be utilized more than the usage of soap and water if hands are not visibly contaminated. Training can be done through compulsory meetings and workshops as well as through proofing and demonstrating the right techniques in handling customers.[20] To ensure compliance is made easier, healthcare facilities need to make the hand hygiene supplies available and reachable easily. ABHR dispensers' location should be near the patient's bedside, at the entry and exits as well as frequently touched surfaces in the ICU. Also, sufficient stocks of soap, disposable towels, and gloves at all the facilities for use when needed are required. Lack of compliance indicators, for instance, inadequate placing of sinks and empty dispensers should be fixed without delay. [21]Supervisory controls and feedback are essential to the success of a hand hygiene regime. It is advised that facilities should ensure conduct of check up to determine the level of adherence from the healthcare workers. This may be direct observation, use of electronic monitoring devices or the use of surrogates which include how often hand rub or soap dispensers are used. Auditing outcomes can then be communicated to the employees or management to encourage appropriate behavior since feedback reaches them on time revealing the areas of Bad practices and requiring correction. It is also important to focus on retaining and promoting those staff members who demonstrate TOP compliant performance to not only encourage good TOP compliant behaviours, but also encourage a culture of compliance to percolate up the organizational hierarchy.[22]Hand hygiene guidelines are optimal when practiced together with other structures of Infection control measures. This includes wearing of Personal Protective Clothing including gloves and gowns during those patient care activities that demand exposure to body fluids or contact with surfaces likely to have body fluids deposits. Training of HCWs for PPE, particularly gloves, should be conducted in order to eliminate the perception that wearing gloves entails adequate hand washing. In additional, ward condition measures, like isolation measures for patients with M/DBO as well as proper decontamination methods of high contact surfaces reduces the environmental contamination besides hand washing practices.[23]

dedicated endurance towards the improvement of standards of hand hygiene and infection control measures requires high level institutional support. Hospital administrators and Infection control committees have to do the work of using their resources, implementing policies within their institutions, and taking the lead in championing the culture of safety. These and other memorable campaigns, like “Clean Care is Safer Care,” can help to popularize the issue and make healthcare workers realize that every single one of them has primary responsibility for protecting the inhabitants of healthcare facilities from HAIs. Moreover patients and families can be involved in hand hygiene promotion for example asking healthcare workers to take an appropriate hand wash.[24] Therefore focusing and institutionalizing hand hygiene and associating it with other standard precautions go a long way in lessening HAIs risks to vulnerable patients and overall improvement of ICUs and general quality of care. All these activities need constant analyses and update with new empirical evidence involvement to ensure lasting success.[25]

The Role of Nurse Education and Training in Infection Prevention

This learning paper seeks to discuss the nurse education and training as well as the role it has in availing infection prevention particularly amongst high-risk group of patients in Intensive Care Units (ICUs). Nurses are the main guarantors of infection prevention; patient care; and maintaining the standards of institutions where they work. A complete package of education and training prepares nurses for the prevention of HAIs and also ensures a safe environment of both, patients and staffs.[26] An effective education program can be most effective if student starts from the basic information regarding HAIs including its causes, transmission channels and outcomes. Nurses must be knowledgeable regarding the microbiological characteristics of the typical pathogens that include *Staphylococcus aureus*, *Pseudomonas aeruginosa*, MRSA and CREs among others. They should also have an understanding of the unique risks, which of course relate to the fact that ICU clients are often immunocompromised and have/shall use devices like central lines, urinary catheters, or ventilators. It is the qualitative knowledge that helps nurses to identify causes of infections and how to avoid them.[27] It is recommended that training programs should focus on such a section of infection control that is supported by sometime evidence. Some of the measure includes proper hand washing and utilization of gloves and other personal protective gears during procedures which require invasive interventions, and the correct manipulations during operations which involve the use devices for medical purposes. For instance, nurses require knowledge on ventilator care bundles to reduce VAP, and center line insertion to decrease CLABSI. This makes a combination of simulations and hands-on workshops useful in expanding the knowledge they acquire because they are given the chance to apply these professional techniques under safe conditions.[28]

These are important because nurses require updated knowledge on new infections threats, new recommendations in infection prevention, and control as well as new antimicrobial-resistant pathogens. The methods include occasionally in-service training sessions, webinars with trained personnel, and other details that include WHO and CDC revised materials. On the same note, highlighting the infection prevention principles in nursing learning packages ensures that the latest-working nursing graduates are trained on these modules from the onset.[29] Education and training also promote accountability and collaboration and other organizational development initiatives ensure that appropriate organizational development focuses on. Nurses who appreciate the significance of infection control is more prone to always follow the measures and also preach them to others. Organization based training programs can support the goal of collaboration, communication and make infection prevention everyone’s business on the healthcare team. In addition, clinical nurses participating in this study should be encouraged to teach patients and families about how to prevent infection and signs of infection to promote sustained change beyond the ICU.[30]

Organizations are able to offer leadership training and specific courses that enable the nurse to assume new responsibilities of an infection prevention officer or as a member of a committee of infection prevention. These roles enable nurses perform policy advisory and formulation, do audits and apply quality improvement measures. For example, infection prevention champions can drive hand hygiene publicity efforts and observe hand hygiene compliance with their peers, encourage the reporting of observations, and facilitate the reporting of such observation in real-time.[15] However, the findings suggested that

education and training should remain necessary approaches to enabling nurses to fight infections adequately. To achieve the objectives of improving nurses' competence, desirably the promoting of continuing education and training, and overall the prevention of HAIs, healthcare institutions should step up their efforts and support for multifaceted training and education. The promise to fight infection prevention in nurse education not only provides a positive impact on solitary patients but also adds to the solidity of care and patient safety of the total health care system.[16]

Monitoring and Evaluating Infection Prevention Interventions

In particular, it is critical to figure out whether the applied infection prevention interventions work in increasing prevention and decreasing HAIs rates in high-risk areas, e.g., ICUs. Systematic approach offers the healthcare institution a way of identifying areas of strength, discovering areas of weakness, as well as improving strategies to achieve the intended goals. Since nurses are the main actors in infection control, they are also usually directly involved in putting in to practice as well as evaluating of these measures.[17] It starts with tracking of data regarding KPI associated with infection prevention and control. These KPIs commonly include crude incidences of particular HAIs, including CLABSIs, CAUTIs, and VAP. Routine monitoring of these measures as a broad indicator paints an accurate picture of the course of infections and areas that need specific management. To achieve accurate data collection, health care facilities need to follow the guidelines, the definitions and reporting techniques from such organizations as CDC or WHO.[18] Other important monitoring techniques include direct observation of implemented infection control measures, including level of adherence to hand washing guidelines and other measures on aseptic procedures, and use of protective clothing. Staff development assessments or interviews conducted by an experienced infection control staff or even a nurse manager can be useful in exposing some of the continued practical application of infection control principles. Information received from such audits, if passed constructively, helps in teaching employees what should or should not be done in terms of process management.[19] Thus, technological tools are taking the central part in monitoring processes as well. Meanwhile, EHRs and infection surveillance systems also can capture data electronically, generate reports, and notify infectious disease alerts in time. For example, the motorization of the use of hand sanitizer or soap dispensers' usage can be a simple way to know the degree of compliance with recommendations. Such systems do not only work to ease the work of the staff but also increase on the timely and accuracy of data.[20]

Monitoring aimed at assessing the impact of the infection prevention interventions involves identifying the results of the analyses of the data gathered for the purpose of decision making on whether the intended goals are being met. For instance, dropping HAI rates whether after introducing a new ventilator care bundle is an excellent sign. Additional qualitative measures can be derived from statistical analysis with the help of trend analysis and benchmarking of these evaluations with national or regional averages.[21] Qualitative method is equally important because it provides assessment of the factors that affect the outcomes of any intervention. The problems that might hinder compliance can be identified through staff questionnaires and focus groups: for example, the shortage of resources, time, or expertise. Likewise, patients' account could also give an indication on the impact of education interventions that are carried out and the perceived safety of the environment.[22] A view on the practice of monitoring and evaluation is also important in order to ensure constant enhancement of the process and the results acquired. Infection control committees should convene to review findings, analyze strengths and weaknesses and make changes that are necessary in any given time. For instance, suppose data provided show infrequent hand washing; the committee could organize more training sessions, place more conveniently located hand sanitizers, or start a comply-with-the-hand hygiene promotion.[23]

Last but not the least, organization culture of openness and accountability is vital to maintaining good infection prevention measures. Disclosure of the contraction rate to the public but not the identity of the patients can encourage the healthcare teams to work harder. In the same regard, reasonable incentives for departments or people that record significant improvements in infection control compliance will act as motivators. Therefore it can be concluded that monitoring and evaluating of infection prevention

intervention are integral part of the over arching infection control plan. This systematic approach allows Healthcare institutions to know whether their efforts to decrease HAIs are efficient and sustainable or not. All these activities not only improve the safety of the patient but also increase the general quality and credibility of the institution. of the healthcare system.[24]

Collaborative Approaches to Enhance Patient Safety in ICUs

Interprofessional collaboration is crucial for improving safety of the patients in ICUs as the patients are usually mostly vulnerable and susceptible to HAIs. It is a model of care that draws on the strengths of being team based, and involves a range of disciplines to address patient care problems, and maintain safety and accountability. Teamwork in ICUs is characterized by cooperation, consultation and co-ordinate action with the general aim of reducing adverse effects and enhancing the benefits.[25]

Team Work and Distributed Accountability

Patient safety in ICUs starts with a properly coordinated team of physicians, nurses, respiratory therapists, pharmacists, and infection control practitioners and other members of the healthcare team. Everyone on the team has particular expertise that leads to holistic client management. For instance, nurses with their patients' continual assessment at the bedside and charged considerably with initiating and enforcing infection control practices and pharmacists who use effective measures to prevent or minimize antimicrobial misuse leading to multidrug-resistant infections. Group discussions focusing on specific patient's case and their management in teams improves the awareness of the context and guarantees consideration of all possible opinions at the time of the decision making.[26]

Communication is essential in ICUs because a lot of interprofessional work is done in them. SBAR (Situation, Background, Assessment, Recommendation) and daily huddle are examples of a structured means of passing critical information, which minimizes the transfer of incorrect information. Closed loop communication in which the receiver acknowledges and repeats the sender's message reduces misunderstandings in situations where verbal communication is frequent, such as in high-stress ICU settings during an emergency. The documentation should also be clear in EHR that makes it easier to pass information from one shift to the other.[27]

Infection Prevention Through Collaborative Efforts

A key area in safety concerns in ICUs is HAIs and especially, collaboration is vital in addressing the problem. Disciplinary representatives are involved in the development and execution of policies for infection control committee including hand hygiene programs, central line care bundles, and isolation precautions. Nurses, with the help of respiratory therapists, are capable of providing adequate care to ventilated patient so as to prevent VAP. In the same way, practitioners and pharmacists collaborate in antimicrobial stewardship services that minimize antibiotic use and fight antimicrobial resistance.[28]

Interacting with Patients and their Relatives

Widespread participation is also apparent in patient and family involvement in care planning. Even when families understand the causes of infections, teaching them about preventive measures like hand washing and correct wearing of PPEs makes them contribute to preventing infections. Family engagement in patient care planning thereby respect their issues meets their needs hence enhancing patients' satisfaction and quality of finish.[29]

Organizing Team Work through Technology

It was proposed that technology can support synergy in ICUs by improving information sharing and problem solving. Communication about data in real time, through the use of EHR, helps team members to get the latest information of the patient, the trends of the infection and the evaluation of the interventions. Telemedicine platforms allow additional specialists to input into cases that the primary team may be unable to handle. Moreover, simulation-based training programs encourage collaborative working since the staff

of the ICU is able to orient on crucial situations like an outbreak of infection or an acute health episode in a controlled setting.

Leadership and organizational support were found to be influential predictors of perceived supervisor support.

Particularly, leadership and organizational commitment are crucial to the development of effective teamwork in ICUs. Nurse managers and those physicians participating in leadership roles should support team work and promote communication among employees. These studies mean that hospitals should consider advocating for training activities that foster improved teamwork including conflict resolution, active listening and consensus. Usually, debriefing and feedback are the best means through which reflections can be made to ascertain that an improvement on the teams can be made. and celebrate successes in patient safety initiatives.[24,25,26,27]

Conclusion

Prevention of infection in ICU patient care is not just a simple clinical science but rather an intricate process involves major components of clinical skill, team work and supportive regulation. Each level of practice contributes to safeguarding patient safety in these vulnerable areas: translating evidence into practice; promoting an accountable context; and ensuring sufficient funding. Specific guidelines need to be set, personnel need to be trained, resources need to be developed and spent, and the outcomes of these criteria must be measured and analyzed by government and other triumvirate masters, healthcare providers and also international health management bodies. Besides extending the impact to hospital-acquired infections, enhancing infection prevention measures contribute to health-care sustainability as well as its quality. Due to these measures the healthcare system may contribute to the enhancement of the ICU patient safety and reduction of the worldwide impact of antibiotic resistance comprehensively.

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التدخلات التمريضية للحد من العدوى المكتسبة في وحدات العناية المركزة

الملخص

الخلفية: تظل العدوى المكتسبة في المستشفيات تهديدًا كبيرًا للمرضى في وحدات العناية المركزة، وبالتالي تتطلب تدابير قوية مدعومة بسياسات صارمة.

الهدف: يهدف هذا البحث إلى اكتشاف انتشار العدوى المكتسبة في وحدات العناية المركزة، والمخاطر المرتبطة بها، والأنشطة التمريضية المسببة للمخاطر، والسياسات التي قد تكون موجودة للفحص.

الطرق: تم إجراء بحث أدبي خصبًا لحدوث سياسات الوقاية من العدوى والسيطرة عليها في سياق وحدات العناية المركزة.

النتائج: تنتشر العدوى المكتسبة في المستشفيات مثل التسمم الدموي المرتبط بالقسطرة المركزية (CLABSI) والالتهاب الرئوي المرتبط بالتنبيب (VAP) وعدوى المسالك البولية المرتبطة بالقسطرة (CAUTI) بسبب التدخلات الغازية والرعاية غير المناسبة لراحة المرضى. تؤثر التدخلات المعتمدة على البحث، وتدريب العاملين، وسياسات التمويل الحاسمة بشكل مباشر على الوقاية من العدوى.

الخلاصة: إن دمج الممارسات التمريضية مع السياسات الفعالة يقلل من العدوى المكتسبة في المستشفيات، ويحسن نتائج المرضى، ويسهم في حل قضايا مقاومة المضادات الحيوية.

الكلمات المفتاحية: الراحة المكتسبة، وحدات الرعاية الحرجة، السيطرة على العدوى، التمريض، السياسات.