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Major Article

Survey to explore understanding of the principles of aseptic technique: Qualitative content analysis with descriptive analysis of confidence and training

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Background: In many countries, aseptic procedures are undertaken by nurses in the general ward setting, but variation in practice has been reported, and evidence indicates that the principles underpinning aseptic technique are not well understood.
Methods: A survey was conducted, employing a brief, purpose-designed, self-reported questionnaire.
Results: The response rate was 72%. Of those responding, 65% of nurses described aseptic technique in terms of the procedure used to undertake it, and 46% understood the principles of asepsis. The related concepts of cleanliness and sterilization were frequently confused with one another. Additionally, 72% reported that they not had received training for at least 5 years; 92% were confident of their ability to apply aseptic technique; and 90% reported that they had not been reassessed since their initial training. Qualitative analysis confirmed a lack of clarity about the meaning of aseptic technique.
Conclusion: Nurses' understanding of aseptic technique and the concepts of sterility and cleanliness is inadequate, a finding in line with results of previous studies. This knowledge gap potentially places patients at risk. Nurses' understanding of the principles of asepsis could be improved. Further studies should establish the generalizability of the study findings. Possible improvements include renewed emphasis during initial nurse education, greater opportunity for updating knowledge and skills post-qualification, and audit of practice.

The purpose of aseptic technique is to minimize the risk of introducing pathogenic organisms into wounds or other susceptible sites while preventing transfer of pathogens from such sites to other patients and staff.[1] These underpinning principles were established in the nineteenth century,[2] and their effectiveness in complex care bundles during the insertion and maintenance of intravascular lines and pulmonary-assisted ventilation have been established in randomized controlled trials. In these studies, doctors and nurses receive special training, and procedures take place in operating rooms or dedicated treatment rooms under strictly controlled conditions.[3–5] In many countries, wound dressing, urinary catheterization, and the insertion and removal of intravenous lines are undertaken by nurses under less stringently controlled conditions, often in the general ward setting.

Despite its importance for patient safety, this topic has been the subject of relatively little research. The few studies undertaken have been small in scale and poorly controlled.[6,7] They report considerable variation in the way aseptic technique is practiced in ward settings. We explored nurses' understanding of aseptic technique in two large inpatient facilities in Wales, United Kingdom (UK). The study was based on the premise that, to practice safely, clinicians need to understand the aims of the procedure they are undertaking and what is necessary to achieve them. The recent literature contains a clear gap regarding nurses' understanding of aseptic technique, as practiced in the ward setting.

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METHODS

The aims of the current study were to determine nurses' understanding of the term "aseptic technique," their confidence in undertaking it, and what opportunities they have to update their knowledge and skills and undergo periodic reassessment to maintain competency. This survey was undertaken with nurses because, in the UK, they are the professional group mainly responsible for undertaking wound dressing, urinary catheterization, and removal of intravenous lines for inpatients.

We targeted a random 10% sample of registered clinical nurses employed on acute surgical and medical wards in each organization, responsible for undertaking procedures requiring aseptic technique as a regular part of their work (n = 250). The sample included ward managers because they are expected to be role models and set clinical standards for ward-based procedures that involve asepsis. Non-registered nursing staff were excluded because, in the UK, they do not receive training to undertake aseptic procedures. One of the hospitals is part of a group that serves an urban and rural population of 600,000 people in South Wales. This hospital provides a full range of acute, intermediate, primary, and community care services and employs 10,000 staff directly involved in patient care. The other hospital is part of a group providing care to a population of 133,000 in mainly rural localities across mid-Wales; it employs 6500 staff directly involved in patient care.

Data were collected with a short questionnaire. Informants were directed to respond to the following: "Please state your understanding of the meaning of the term 'aseptic technique' in your own words." "Closed" queries which required a yes/no, single word or very simple answer established informants' clinical grade, area of practice, information about training in aseptic technique, and experience and confidence in ability to practice. Questionnaires were distributed during a 1-week period, in July 2016, throughout the two organizations, by a team of data collectors not acquainted with the respondents. . They were returned in envelopes, in person, to the data collectors, immediately upon completion.

Analysis

Data from the "open" question which allowed for more expansive answers were subjected to summative content analysis in a two-step procedure, according to the method described by Hsieh and Shannon.[8] In the initial step (manifest content analysis), use of key words required to understand asepsis (e.g., "clean," "sterile," "disinfect"), and phrases relating to the meaning of the term "aseptic technique," were documented and taken at face value. We inspected the data for the frequency that each key term was used alone and in conjunction with the others. In the second stage (latent content analysis), we explored the underlying meaning of these key words and phrases. Detailed, repeated inspection and discussion of the text took place among members of the research team, to look for evidence that nurses' definitions of aseptic technique demonstrated understanding of the underlying principles. Using summative latent content analysis, we explored how often nurses used particular terms, such as "cleaning" and "sterility," confusion over use of these terms, and apparent gaps in understanding. Two members of the research team worked on each response, independently first, and then in pairs to discuss and interpret findings. Any disagreements were resolved through third-party arbitration. Informants' definitions of aseptic technique were validated against the standard definition given earlier.[1] Data from the "closed" questions were categorized according to the questions on the fixed-choice scale, keyed into an SPSS (version 24) computer file, and analyzed descriptively (with means, medians, and bar charts).

Ethical considerations

Permission to undertake the study was granted by the Research Ethics Committee at the university where the principal investigator was employed. The questionnaires were anonymous and were returned in envelopes; respondents were assured that they and their employing organizations would not be identified in publications. Respondents received a one-page information sheet about the study, and they signed consent forms. Infection prevention has received considerable attention from policymakers and managers in recent years, and in some cases, punitive methods have been employed in attempts to improve compliance.[9,10] We obtained data in a ward setting, rather than in classrooms, and were mindful that health workers have reported resentment and frustration regarding constant reminders about infection prevention.[11] The brief, anonymous questionnaire was designed to avoid anxiety and encourage participation.

RESULTS

Questionnaires were completed by 180 registered nurses (72% response rate). Most were in clinical posts in junior (n = 125; 68.1%) or middle levels of seniority (n = 32; 17.6%). Twenty six (14.3%) were ward managers. No significant differences in response between hospitals was found.

Manifest content analysis

A total of 143 (78%) registered nurses responded to the "open" question, and of these, one claimed to not understand what the term "aseptic technique" means. Manifest content analysis revealed that more than half (n = 91; 64.9%) identified aseptic technique as a procedure or method, not in terms of the principles underpinning it. Typical examples from different respondents are as follows:

> Cleaning your wound trolley before and after dressings. Opening all your dressings/packs prior to putting your gloves on to do your dressing. Using hand gel. Putting your gloves on and washing hands/drying.

> Cleaning the trolley before you place a pack on it. Washing your hands. Getting someone to drop sterile gloves on the sterile field inside the pack. To put gloves on without touching the outsides. Then someone to put all objects needed for the procedure onto the sterile surface without touching it.

Other nurses restricted their responses to selected elements of the procedure, singling out for special mention hand hygiene, avoiding touching equipment, and use of gloves. Wound dressings were usually suggested as an example of a procedure requiring aseptic technique. The insertion and management of intravenous lines and urinary catheters were occasionally mentioned.

Fifteen (10.5%) nurses used the words "non-touch aseptic technique," and a further fifty eight (41%) used the term "sterile" in relation to the equipment or the field/environment in which the procedure was conducted:

> A procedure that uses a sterile technique.

> Performing a task by having a sterile workplace . . . and only using sterile equipment. (Respondent 29)

> Using a sterile field in procedures.

The terms "clean" or "cleanliness" were used by 19 (14.4%): with one saying

> "Reduce infection. Clean procedure."