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Review

Evidence based emergency nursing: Designing a research question and searching the literature

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ABSTRACT

The purpose of research is to discover new knowledge. All good research starts with a clear, answerable question that addresses an important and significant problem or phenomenon of interest. In this paper, emergency nurses and other clinicians will be provided with a practical guide to successfully developing a quality research question as the basis of quality research. In this paper, how to plan and prepare question development using the PICO Framework, develop a literature search strategy, and perform a search, extracting and analysing information will be detailed.

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1. Background

Good research starts with a clear, answerable research question that addresses an important problem or phenomenon of interest [3]. Research should also be guided by prevailing local, national and international priorities, organisational strategic goals and relevant professional standards. Formulating a specific and answerable research question is often challenging for the beginning researcher [3]. Observations of clinical practice, deep and considered reflection of personal and clinical experiences, and an inquiring mind are good foundations for well-developed research

questions [3]. In this paper, emergency nurses and other clinicians will be provided with a practical guide to successfully developing a quality research question as the basis of quality research. In this paper, how to plan and prepare question development using the PICO Framework, develop a literature search strategy, and perform a search, extracting and analysing information will be detailed.

It is common in the early stages of the research process for research questions to be broad in scope and consequently difficult to answer. Considerable care and time are spent refining the problem or phenomenon of interest to develop a research question that enables a rigorous and robust search of the literature using key terms [3]. Failure to develop a specific and answerable research question places the whole research process in jeopardy [5]. Key to the success of any research project is the setting of a clear, answerable research question that is informed by a comprehensive and systematic review of the literature, as described in this paper.

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2. Planning and preparation

Planning and preparation for developing a research question for quality outcomes should address four fundamental questions detailed in Table 1. All research, no matter how big or small, should begin with answering 'The Fundamental Four'.

In a more formal sense, such questions are expressed in an array of systematic strategies for quality research, such as the PICO Framework.

2.1. Using the PICO Framework for question development

PICO is a well-known and widely used framework for developing robust and answerable research questions. The PICO Framework is also useful for framing quality assurance or evaluation projects. The PICO Framework consists of four components, which inform the development of a 'PICO Question':

- (P)roblem or (P)opulation
- (I)ntervention
- (C)omparison, and
- (O)utcome(s) [19].

The PICO Question supplements to the aim of the study or literature review and forces the researcher to express the question with

Table 1
The Fundamental Four for informing quality research.

1. What do we know?	<ul style="list-style-type: none"> • What has already been written about the topic / issue of interest? • Has the issue of interest already been investigated? –If so, by whom, when, and in what context? • Has the question already been answered?
2. What don't we know?	<ul style="list-style-type: none"> • Is this a new or emerging issue that has not been addressed previously? • Is there a gap in the research literature that makes this a new problem or issue? For example, has the problem or issue been investigated at a different time? In a different context?
3. What should we know?	<ul style="list-style-type: none"> • What is the specific gap that this study/literature review is going to address?
4. Why should we know it?	<ul style="list-style-type: none"> • Why is addressing that gap important? for patients? for families? for clinicians? for the broader health system?

Table 2
Examples of recently published reviews and PICO questions.

Aim	PICO question
Example 1: Systematic Review: to examine the evidence related to spinal immobilisation in pre-hospital and emergency care settings [8]	P: victims with suspected spinal injury I: use of spinal immobilisation during pre-hospital or emergency care C: no immobilisation O: neurological outcome, prevention of movement, spinal positioning/alignment, comfort or pain, and complications
Example 2: Integrative Literature Review: to synthesise existing evidence on the impact of multidisciplinary simulation-based resuscitation team training on team performance, and patient and health service out-comes. [24]	P: teams who respond to in-hospital resuscitations I: teamwork training using simulation C: N/A O: impact of team training on team performance and efficiency of patientcare

precision and specificity [13]. Examples of recently published reviews and their PICO questions are shown in Table 2.

As illustrated in example 2, not all PICO questions will have an intervention and a comparator. Some PICO questions compare an intervention with no intervention and other PICOs compare one or more interventions.

2.2. Developing a search strategy

The purpose of the literature search is to identify existing published research in the particular area of interest to assist the researcher to clarify and specify the research question, and to identify whether the research question has been answered. The search of the literature must be strategic and systematic, and informed by a documented strategy. Search strategies have two major considerations: search terms, and databases. The PICO Framework should also be used to develop the search terms that are informed by the PICO question, Medical Subject Headings (MeSH) and any other terms deemed to be relevant. The resulting PICO question should be written out in full and then the main terms defined and main topics identified, as is illustrated in Table 3.

Alternative terms and spellings must be considered, for example paediatric vs pediatric or epinephrine vs adrenaline. It may be appropriate to perform a scoping review using the main terms from the PICO question to get a sense of the breadth and depth of the literature, which will then inform the search strategy. Scoping reviews map the existing literature or evidence base related to the topic of interest but do not describe the findings in detail or take the quality of evidence into account as an initial priority [1]. It is also useful to look at the PICO question from seminal studies identified during the scoping search.

The study inclusion criteria should be described and typically only research papers should be included in a literature review, depending on the nature of the review being undertaken. Although reviewing papers are not typically included in the literature review, they are a good source to cross reference to double check for studies that your search may have missed. The inclusion criteria should consider gender, age of participants, year(s) of publication and study type. For example, if a PICO question is related to antenatal care then gender would be limited to women. Age limits may be set for PICOs that specifically target children or the elderly. The year(s) of publication may be unlimited for PICOs where there is

Table 3
Defining main terms and topics from PICO question.

PICO	
Example 1 [8]	Spinal injury: spinal cord injury, spine fracture Spinal immobilisation: manual in-line stabilisation head blocks, spinal boards, cervical collars Pre-hospital care or emergency care: emergency treatment, emergency care, first aid, emergency department Complications: respiratory compromise, raised intracranial pressure, pressure injuries Resuscitation: defined as acting on immediate and life threatening patient emergencies Teams: emergency medical services, trauma team, rapid response team, medical response team Patient care: length of stay, diagnostic error, delayed diagnosis, patient safety, decision making
Example 2 [24]	
P: victims with suspected spinal injury	
I: use of spinal immobilisation during pre-hospital or emergency care	
C: no immobilisation	
O: neurological outcome, prevention of movement, spinal positioning/alignment, comfort or pain, and complications	
P: teams who respond to in-hospital resuscitations	
I: teamwork training using simulation	
C: N/A	
O: impact of team training on team performance and efficiency of patient care	

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