Critiquing a Research Article

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It is often the assignment of the perianesthesia nurse to critique a research article to evaluate a suggested procedure or instrument for implementation in the patient care area. Although details of what should appear in each section of the research article have appeared in past reports in this series, this article will present an outline for critiquing the entire research manuscript. © 1998 by American Society of PeriAnesthesia Nurses.

Although much attention is given to implementing research in nursing practice, the need to carefully evaluate that research before implementing it is often given less attention. This series I have been writing on understanding research has focused on critiquing one section of the research manuscript at a time. This article will reference the previous manuscripts but will attempt to bring it all together in one place.

Title and Abstract

It is the title and abstract of an article that draws our attention and peaks our interest. When used in that manner neither require critique, but should the assignment be to critique a research manuscript (for a class), we will need to look at the title and abstract in the same detail that we look at the rest of the manuscript. Unfortunately, we cannot do so until we have read and critiqued the article. So we will return to the title and abstract at the end of this report.

Introduction

Most research articles begin with some sort of an introduction. This section may be labeled “introduction,” but most often it is not. Sometimes, the introduction runs directly into the review of the literature and sometimes there is a separate subtitle. Whether or not it is subtitled or separated from the review of literature, the point of the introduction is to orient you to the problem that is to be investigated. In prose format, the author may tell you something like the following (depending on subject matter of course):

1. The American populace has a high incidence of adult onset diabetes.
2. The vast majority of Americans are totally sedentary, getting no regular exercise.
3. Adult onset diabetes may be preventable with regular vigorous exercise.
4. The key to getting Americans exercising and keeping them exercising is unknown.

At this point, the author will conclude the introduction with a statement something like, “Therefore it was the intention of this research to evaluate the success of a motivational program in keeping adults compliant with an exercise program.”

When critiquing the introduction you should ask yourself if the author has made a good case for the study he/she is about to present. Does the research question logically follow the points made previously? From this section, you should understand what the author’s intentions are. Is the author telling you that what he/she is seeking is basic knowledge for the understanding of a problem (so that others may come up with interventions), or is he/she seeking the solution to a clinical problem.

The author may present definitions of terms or assumptions used in the research or may wait until the Review of Literature or even the Methods.
section if that is appropriate. There is no perfect place to put definitions or assumptions, and they are not always necessary, but if you find yourself reading and not knowing how the author is using a term, they obviously have placed their definitions too late in the text.

When reading this and every section of the manuscript, ask yourself if it is well written. People who have something important to say can make themselves understood without relying on the crutch of jargon. A well-written research report does not necessarily involve the largest or most obscure words, nor is there usually a prize for the longest, most convoluted sentence. Having said that, Florence Down, Editor of Nursing Research, once held a contest for the worst opening sentence in a research report. The winners were wonderfully awful. First place prize was given to Donna Diers for the following sentence. (The original sentence had 12 reference citations which I have left off because I could not bear to type them.)

"The interaction coefficient in dyadic helping relationships as occurs between nurses and patients or nurse practitioners and patients or clients (for the distinction is characterized by mutuality of duality as opposed to consensus of opportunity) correlates positively with hierarchical but not dominance-performing distribution of rewards (as occurs in balanced professional negotiations) and requires investigation beginning with taxonomical theoretically qualitative investigation but includes quasi-experimental derived hypotheses."

That sentence is quite amusing, if you have that sort of sense of humor, and if you had read so many similar sentences that were not intended to be funny. If you find yourself reading that sort of prose, find something more useful to do with your time. Because even if you can stay awake long enough to wade through the manuscript you will have no idea what was said when you are finished.

THEORETICAL OR CONCEPTUAL FRAMEWORK

This section may precede or follow the review of literature section, depending on the subject, or may be entirely absent. When I have my academic cap on, I will say that all research can benefit from the use of a theoretical framework. Studying a question within the context of a theoretical framework will make the findings more useful in the long haul. On the other hand, the author may not be interested in fitting his/her question into a larger picture. They may simply be looking for the best widget for a particular job. This is the author’s choice.

Should the author choose to use a theory, the author needs to use it, not just drop it off like the Queen of Spades when playing Hearts. If the author uses a theoretical framework, he/she is (supposedly) doing so to (1) test a theory, (2) to understand a process or behavior, or (3) to organize a mass of what may appear to be disparate data so that the reader can understand it better. If the author is using a theory for one of these three reasons, he/she will be logically required to revisit the theory in the discussion section.

One final point. Just because we are nurses does not necessarily mean that we are required to use “Nursing Theories” to frame our questions or understand our answers. If a nurse who happens to be doing research on a particular group of people chooses to use a theory from sociology, and it works for the nurse and his/her study, this is fine. Requiring the nurse to use a “Nursing Theory” is a political issue, not a research or science issue.

THE REVIEW OF LITERATURE

In short, the review of literature section should present related research, research findings, and the gaps in the research. Good reviews of literature will discuss the methods of the previous studies and try to make sense out of the failures of the past. This way the reader will know that the author is prepared to undertake the next step in the research on this subject. The author may say something along the following lines:

1. Tom used the Health Belief model to design his interventions in a study of exercise, but discovered that changing people’s understanding of the benefits of exercise did not change their behavior.
2. Jane used the Self-efficacy theory to frame her interventions. Unfortunately, her 2-day-a-week, 6-week intervention did not show a change in behavior at 6 months.
3. Dick also used the Self-efficacy theory, but instead of a 2-days-per-week intervention he provided the subjects with a 4-day-per-week intervention for 6 weeks. Unfortunately, his method of evaluating behavioral change may have been insensitive.
4. In conclusion, the past literature suggests that the Self-efficacy theory may be useful in framing interventions designed to change
exercise behaviors, but the past research investigated interventions or used evaluation tools that may not have been powerful enough to demonstrate lasting change.

All too often an author will present a series of articles that seem to do nothing more than support what appears to be the author's point of view. In some cases, the author makes such a good case for why what he/she is investigating must be true we have to wonder why the author is doing the research at all.

There is almost no place for secondary references, including review articles and books, in the review of literature section. The author needs to confine himself/herself to primary references so that he/she can evaluate the methods of prior research. It is also important to evaluate whether the author has been selective in the use of past research so that he/she cites only articles that support his/her view-point. Sometimes this is hard to know. Presumably, if you are evaluating an article because it discusses a procedure or instrument you are interested in implementing on your unit, this will not be the only article you read on that subject. If you find the author is missing a few key articles, then you will know that the review of literature is not complete.

The beginning section of a research article should present the problem, the past literature, and possibly a theoretical framework in which to study the problem. This section will close with either detailed research questions, specific aims, or hypotheses. Specific aims will look something like this:

This study is designed to:
1. Recruit nonexercising men and women between the ages of 40 and 49 into a diabetes/cardiovascular risk evaluation.
2. Enter 200 people at risk for diabetes, with recent onset diabetes, or at risk of cardiovascular disease who can state they are prepared to commit at least 3 hours a week to an exercise program.
3. Randomly assign half to a passive intervention and half to an aggressive intervention.
4. Institute a 1-year exercise program that retains at least 70% of the subjects in the aggressive intervention group.
5. Compare exercise participation rates of groups.

A hypothesis on the same subject will look something like this. "Adults between the ages of 40 and 49 and at risk for adult onset diabetes who receive an aggressive exercise intervention program will have a higher rate of participation in exercise one year after initiation of the program than similar adults who are exposed to an educational program only."

Regardless of whether the author chooses to use specific aims or hypotheses, when evaluating this section you will need to ask yourself whether these statements logically flow from the introductory material, are they clearly and unambiguously worded, and are they testable. From this point, it will be an easy transition to the methods section of the article.

METHODS

The methods section usually contains the following four subsections: subjects, instruments, procedures, and analysis. The first thing you need to ask yourself about the entire section is "Does the study design fit the question?" For example, if the author has made a case for determining the best way to rewarmp postoperative patients, does he/she then go on to describe a survey designed to describe the most common method of rewarmping patients. The methods must make sense.

Subjects

The subject portion of the methods section describes who it is that is being studied and how they were selected. The choice of subjects should make sense in light of what has been said to this point. If the researcher has criticized past research because it studied only men or was not ethnically diverse, it would not make sense for the current author to use only white men.

Sample refers to the people who are actually studied. Population refers to the people to whom the findings of the research can be generalized. If, for example, a researcher from a particular PACU stated that during the course of 1997, 2,000 patients received care in her PACU. She is interested in some aspect of their care and randomly selects a sample of 200 charts from the population of 2,000. She can then generalize to the population and no further. It is up to you the reader to decide if her findings have some relevance to your population in your PACU.

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Few studies contain subjects that are randomly selected from some population. Most nursing studies use convenience samples. In that case, the sample and the population are the same, and I generally refer to both of them as the population.
The population should make sense in terms of what it is the researcher is looking for. If the author is looking for a very clear answer to a very circumscribed question, then a small homogeneous sample may be appropriate. On the other hand, if the author knows how something works in the test tube or in a narrow population, and now wants to see how it works in the real world, a much broader population might be called for.

I often see articles criticized because a gender, age, or ethnically diverse population was not included in the sample. Requiring the author to expand the study population to reflect the population of the world may be an unnecessary expense. If, for example, the question is “does exercise reduce the rate of bone loss in postmenopausal women?” it is probably not necessary to study an ethnically diverse population (I am not aware of any evidence that would suggest that the bones of different ethnic groups respond differently to exercise). On the other hand, if the question concerned access to exercise facilities and social support to maintain an exercise routine, then a diverse group is a must.

The point is that the study population must fit the question. The size of the population must also be appropriate. If the author is looking at a question that involves subtle changes or a lot of variables, then a large population will be required. The author should tell the reader how he/she came up with the planned sample size.

Finally, the author should explain what was done to ensure the subjects’ human rights were not violated, or in the case of nonhuman animals, that the animals were treated in a humane manner. In both cases, the authors must note that the research was approved by the appropriate Human Subjects or Animal Subjects Research Committee. These comments are sometimes included in the Procedure section.

Instruments

At this point, the author may choose to present a mini-review of the literature on the selected instruments. It must be clear that the instruments (be they thermometers or questionnaires) are the best tools to answer the questions. The author should address questions of validity, reliability, and sensitivity.

For a tool to be valid, it must measure the concept under question. Remember, there may be plenty of evidence that a tool is valid under one circumstance, but the author has to tell the reader why it is a valid measure of the concept he/she is investigating under the circumstances he/she has set up.

Instrument reliability will need to be substantiated. If there is more than one investigator, the author needs to show that when the instruments are used by more than one investigator on the same subjects, the same scores are obtained (intrarater-reliability). Just as with validity, the author needs to evaluate the reliability of the tools used in the manner that he/she has used them.

Sensitivity refers to the instrument’s ability to pick up subtle changes in the phenomenon being studied. Should the intervention that is being studied result in a 10% reduction in postoperative pain for most people, but the instrument being used only picks up reductions of 20% or more, then it will appear as though there is no improvement. In this case, the instrument is insensitive. There should be some indication in the instrument section that the author has considered this.

Procedure

The procedure section should describe to you how the study was done. What was done? In reference to the questions that were presented in the earlier part of the manuscript, the author should, at this point, tell you exactly what an aggressive exercise regimen consisted of. The author should give you enough detail so that you could repeat the study exactly if you wanted to. Duration of intervention and evaluation schedule should be clear.

It is at this point that the major risks to internal validity will be apparent. You should ask yourself when reading this section “Is there anything else going on here that could explain the results, other than what the author has done?” Does the researcher evaluate change too infrequently? Are the control group and experimental group exposed to inconsistent influences other that the experimental intervention, that might explain their differences? Is the evaluator blinded to which intervention the subject received?

Analysis

In this section, the author will describe how he/she plans to analyze the data. The author should describe how missing data will be handled and what statistical tests will be used.
RESULTS

The results section should not be Greek or some other language that you cannot understand. If the researcher is publishing a manuscript in the Journal of PeriAnesthesia Nursing, then the researcher is under some obligation to present the findings in a manner that the readership will understand.

The results section should begin with a description of what was found and then proceed to a statistical analysis if appropriate. It is not acceptable for the author to describe the statistical significance of a finding without ever telling you what that finding was. Remember that statistical tests usually only tell you whether the difference found in the groups can be attributed to chance or not; it does not tell you the size of the difference or if the difference is an important one.

The results should logically follow the questions of the study. If the author presents a series of questions to be asked or hypothesis to be tested, the results should march through those questions one at a time.

DISCUSSION

The discussion section usually begins with a brief synopsis of the study findings. Is this synopsis accurate?

Does the author interpret or discuss the findings so that they have meaning to the readers of the journal in which he/she has presented in the study? The researcher should interpret the findings in light of other findings—similar and conflicting. Does the author suggest implications for the findings without exaggerating? Does the author revisit the theoretical framework and tell us what the findings mean in terms of the theory? The author also should describe limitations of the study without going into the obvious ones. The author may, but does not have to, make suggestions for further study based on his/her findings.

ABSTRACT AND TITLE

Finally, you are in a position to evaluate the abstract and title. The title should be reasonably short but descriptive. I always feel annoyed by the titles that say “The impact of X on Y” but when you read the actual manuscript you discover there is no impact of X on Y. The study found no impact. The title should be accurate and if possible reflect the population studied, ie, “The lack of impact of X on Y in little old ladies.”

The abstract should briefly describe the question, the sample, the methods, and the findings. The abstract should not contain so much information that it is redundant to read the manuscript. It is inappropriate for the abstract to reflect only the “positive” findings and to conveniently overlook the “negative” findings. The abstract should contain the important words of the study since it is often used for indexing the study.

When critiquing a research article or a number of related articles, the more you read the easier it will get, especially if you combine reading research with reading about research. It will also be easier and more enjoyable if you do it with a small group. Different people will bring differing perspectives and past knowledge to the process.

REFERENCES

1. Downs FS: Congratulations! You’re the worst! Nurs Res 34:70, 1985